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IMS/Satellite Situation Center Report

Predicted Orbit Plots for Hawkeye 1 - 1976

REPORT NO. 2

DECEMBER 1975



I. INTRODUCTION

This report contains predicted orbit plots for the Hawkeye 1 satellite for the time period January-December 1976. This satellite has been identified as an important possible contributor to the International Magnetospheric Study (IMS) project. The predicted orbit plots are shown in three projections. The time period covered by each set of projections is 2 days 1 hour, corresponding approximately to the period of Hawkeye 1. The three coordinate systems used are the Geocentric Solar Ecliptic system (GSE), the Geocentric Solar Magnetospheric system (GSM), and the Solar Magnetic system (SM).

For the GSE system, the X-axis is along the Earth-Sun line toward the Sun, and the Z-axis is perpendicular to the ecliptic plane such that the Y-axis is toward dusk. The GSE projection at the top left of the set of three plots shows the satellite trajectory rotated into the X-Y plane in order to illustrate the relative positions of the satellite and the bow shock and magnetopause boundaries. Fairfield's model (1971) for the average position of these boundaries has been used. This model corresponds to a solar wind velocity of 420 km/sec. For positive X values, a spherical rotation of the satellite radius vector has been performed at constant ecliptic longitude. For negative X values, a cylindrical rotation of the Y and Z components of the radius vector has been performed at constant X.

For the GSM system, the X-axis is along the Earth-Sun line toward the Sun, and the X-Z plane contains the geomagnetic dipole such that the Z-axis is positive northward and the Y-axis is toward dusk. The GSM projection at the top right of the set of three plots shows the satellite trajectory projected onto the Y-Z plane in order to show the relative position of the satellite and the neutral sheet. A simple model for the neutral sheet is assumed: the sheet is hinged onto the geomagnetic equator at 10 Earth radii in the antisolar direction and lies in the GSM X-Y plane. The neutral sheet positions are shown as horizontal lines corresponding to six equally spaced times of the first day covered by the plot. The extent of the horizontal lines in Y has no significance. The projected trajectories are shown as solid lines for X < -10 Earth radii and as dashed lines for X > -10 Earth radii. The dashed lines indicate that the satellite is not in the region of the neutral sheet regardless of Z values.

For the SM system, the Z-axis contains the north magnetic pole, and the Y-axis is perpendicular to the Earth-Sun line toward dusk. The satellite trajectory is shown at the bottom of the set of three plots as magnetic latitude and magnetic local time. These values of magnetic latitude and magnetic local time use SM latitude and longitude as a basis.

For each of the three projections, time ticks and codes are given on the satellite trajectories. The codes are interpreted in the table at the base of each plot. Time is given in the table as year/day/decimal

hour. The total time covered by each plot is shown at the bottom of each table. An additional variable is given in the table for each time tick. For the GSM and SM projection this variable is the geocentric distance to the satellite in Earth radii, and for the GSE projection the variable is satellite ecliptic latitude in degrees.

For the orbit predictions shown in this report actual spacecraft elements for epoch April 1975 were used. The predicted elements for January 1, 1976, are shown in Table 1.

II. HAWKEYE 1 ORBIT CHARACTERISTICS FOR 1976

The high inclination of the Hawkeye 1 satellite precludes neutral sheet encounters, and thus the GSM projections shown in this report are of limited value. However, the precession of apogee in longitude provides a number of extremely useful cusp passes, magnetosheath passes, magnetopause passes, and bow shock encounters throughout 1976. It should be noted that the Hawkeye 1 satellite is the only satellite that potentially provides good coverage of the direct access region in 1976, and is therefore particularly important to the IMS in this respect.

II.1 Cusp Passes

For the present purposes the direct access or cusp region is taken as that given by Heikkila (1972) for low-energy particles and extends over the magnetic latitude range, 75° to 80° north, and over the local magnetic time range, 8 hours to 16 hours. In addition, the access region is bounded by the magnetopause boundary given by Fairfield's model (1971). Note that the Hawkeye 1 satellite is not well suited for observing the corresponding access region in the Southern Hemisphere. Fifteen Hawkeye 1 passes through the direct access region have been identified for 1976 and are summarized in Table 2. The passes indicated in this table are those with duration greater than 3 hours. There are many other passes of shorter duration in 1976. The table shows approximate entry and exit times and time in the cusp region, together with the approximate altitude range covered. The first altitude given corresponds to the entry time. Most of the passes are in pairs corresponding to consecutive revolutions, and it is evident from the table that most occur in the first 3 months of 1976. As apogee precesses away from the direct access region early in the year into the interplanetary medium in March, the altitude range covered by the Hawkeye 1 direct access passes becomes progressively lower.

II.2 Magnetopause and Bow Shock Crossings

The Hawkeye 1 satellite encounters the model magnetosphere boundary twice per revolution (period = 2871 min) throughout 1976.

Table 3 is a summary of these magnetopause crossings that shows, for any given time period, the quadrants in which these encounters occur. Over the time periods Day 5-222 and Day 339-366, Hawkeye 1 is in interplanetary space for a variable portion of each revolution. Over the same time period, therefore, there are two bow shock encounters per revolution. These encounters occur for positive X only. The quadrants in which the encounters occur are summarized in Table 4. Over the time periods Day 222-240 and Day 300-339, the Hawkeye 1 trajectory is particularly suitable for observing the magnetosheath. For these time periods the satellite spends between 17 hours and 22 hours per revolution in this region. For the first time period the passes are predominantly in the noon/dawn and dawn/midnight quadrants, and for the second time period in the midnight/dusk and dusk/ noon quadrants.

III. SPACECRAFT AND EXPERIMENT STATUS

The Hawkeye 1 satellite carries three experiments, all of interest to IMS participants: low-energy electron and proton analyzers (L. A. Frank), ELF/VLF receivers (D. A. Gurnett), and a triaxial fluxgate magnetometer (J. A. Van Allen). Note that of these three principal investigators only D. A. Gurnett appears in the IMS Directory (IMS Program Summary No. 0181). Brief descriptions of these experiments are given in pages 7-9. At the present time these experiments are functioning normally. However, data are presently being taken from Hawkeye 1 only approximately 50 percent of the time (see brief descriptions for details). Further, the present plans are to terminate Hawkeye 1 operations during July 1976. However, it is hoped that the obvious contribution of the satellite to the IMS project will result in continued operation at least on a partial basis.

IV. FUTURE OPERATIONS

The Satellite Situation Center (SSC) maintains orbit prediction plots on 16-mm microfilm for Hawkeye 1 of the type shown in this document for the time period January 1977 through May 1978, when the satellite is expected to reenter. These plots may be obtained upon request.

REFERENCES

- 1. Fairfield, D. H., "Average and Unusual Locations of the Earth's Magnetopause and Bow Shock," J. Geophys. Res., 76, 28, 6700, October 1971.
- 2. Heikkila, W., "Penetration of Particles into the Polar Cap Regions of the Magnetosphere," <u>Critical Problems of Magnetospheric Physics</u>, Proceedings of the Joint COSPAR/IAGA/URSI Symposium, Madrid, May 1972.

Table 1. ORBIT PARAMETER SUMMARY TABLE FOR HAWKEYE 1

Alternate Satellite Names	Injun-F Neutral Point Explorer Explorer 52
International ID	74-040A
Epoch (YY-MM-DD-HH-MM)	76-01-01-00-00
Period (min)	2871
Eccentricity	.847
Inclination (deg)	88.5
R.A. of Ascending Node (deg)	287.74
Argument of Perigee (deg)	253.99
Mean Anomaly (deg)	257.89
Semimajor Axis (km)	70040,147
Perigee Height (km)	4336.88
Apogee Height (km)	122987.081
Local Time of Apogee (HH-MM)	12-36
Latitude of Perigee (deg)	-73.35

Table 2. MAJOR CUSP PASSES FOR HAWKEYE 1 IN 1976

Entry Time (day/hr)	Exit Time (day/hr)	Time in Cusp (hr)	Altitude Range (Earth radii)
2/23.0	3/7.0	8.0	19 - 14.3
5/ 4.0	5/8.0	4.0	17.7 - 15.8
17/23.0	18/7.0	8.0	17.8 - 13.2
20/ 4.0	20/8.0	4.0	17.1 - 14.9
33/ 0.0	33/6.0	6.0	16.8 - 12.8
35/ 3.0	35/7.5	4.5	16.9 - 14.2
48/ 0.0	48/6.0	6.0	16.0 - 11.5
50/ 2.0	50/7.0	5.0	16.6 - 13.5
63/ 0.0	63/5.0	5.0	15.0 - 11.0
65/ 2.0	65/7.0	5.0	15.9 - 12.2
78/ 1.0	74/4.5	3.5	13.3 - 9.9
80/ 2.0	80/6.0	4.0	15.0 - 11.7
92/23.0	93/2.5	3.5	13.7 - 10.5
351/ 0.0	351/7.0	7.0	16.1 - 10.5
366/ 0.0	366/6.5	6.5	15.0 - 9.3

Table 3. MAGNETOPAU E CROSSINGS FOR HAWKEYE 1 IN 1976

man part 1 (1)	GSE Quadrant			
Time Period (days)	Noon/Dawn Dawn/Midnight		Midnight/Dusk	Dusk/Noon
1-23			1/rev	1/rev
23-76	1/rev		1/rev	
76-121	1/rev			1/rev
121-176		1/rev		1/rev
176-224	1/rev	1/rev		
224–257	1/rev		1/rev	
257-298		1/rev	1/rev	
298-329		1/rev		1/rev
329–366			1/rev	1/rev

Table 4. BOW SHOCK CROSSINGS FOR HAWKEYE 1 IN 1976

	GSE Quadrant		
Time Period (days)	Noon/Dusk	Noon/Dawn	
5–33	2/rev		
33–168	1/rev	1/rev	
168-222		2/rev	
339-366	2/rev		

SPACECRAFT/EXPERIMENT CHARACTERISTICS

SPACECRAFT COMMON NAME- HAWKEYE 1 ALTERNATE NAMES- INJUN-F. NEUTRAL POINT EXPLORER EXPLORER 52

NSSDC ID- 74-040A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 07/20/75.

SPACECRAFT WEIGHT-LAUNCH DATE- 06/03/74 -LAUNCH SITE- VANDENBERG AFB. UNITED STATES LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY NASA-OSS UNITED STATES

INITIAL ORBIT PARAMETERS DRBIT TYPE- GEOCENTRIC ORBIT PERIOD- 3032. MIN PERIAPSIS- 6848. KM ALT

EPOCH DATE- 06/03/74 INCLINATION- 89.78 DEG APOAPSIS- 131948. KM ALT

RECENT ORBIT PARAMETERS ORBIT TYPE- GEOCENTRIC ORBIT PERIOD- 3076.6 MIN INCLINATION- 89.7 DEG PERIAPSIS- 2998. KM ALT

EPOCH DATE- 02/25/75 APDAPSIS- 124388. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST) PM - J.E. ROGERSU OF IOWA

IOWA CITY. IA DM - CAWA COFFEE JR. NASA-LARC HAMPTON. VA

PS - J.A. VAN ALLEN U OF IOWA IOWA CITY. IA

SPACECRAFT BRIEF DESCRIPTION

HAWKEYE WAS PART OF THE U.S. CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THE MAIN PURPOSE OF THIS TO STUDY THE NEUTRAL POINT REGION OF THE WAS MAGNETOSPHERE. THE EXPERIMENTS INCLUDED PARTICLE AND FIELD OBSERVATIONS AND LOW-ENERGY PLASMA STUDIES RELEVANT TO THE DYNAMICS OF SOLAR WIND INJECTION INTO THE MAGNETOSPHERE. THE SPACECRAFT WAS SPIN-STABILIZED WITH A SPIN RATE OF ABOUT 6 RPM AND A SPIN VECTOR PARALLEL TO THE EARTH'S EQUATORIAL PLANE. INITIAL APOGEE POSITION WAS OVER THE EARTH'S POLAR CAP IN THE NOON-DUSK QUADRANT. INITIAL SPACEGRAFT AND EXPERIMENT PERFORMANCE WAS NORMAL. IN LATE JULY. 1975, OVERALL DATA COVERAGE WAS REDUCED TO 52 PER CENT BY DELETING COVERAGE WHEN THE SPACECRAFT WAS BEYOND 15 EARTH RADII. APOGEE COVERAGE WAS RESTORED FOR ONE ORBIT IN FIVE ON SEPT 24. 1975.

ORIGINAL PAGE IS OF POOR QUALITY

SPACECRAFT/EXPERIMENT CHARACTERISTICS

---- HAWKEYE 1. FRANK ----

EXPERIMENT NAME- LOW-ENERGY PROTONS AND ELECTRONS

NSSDC ID- 74-040 A- 32

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 07/20/75. EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR TL=TEAM LEADER DI=OTHER INVESTIGATOR. TM=TEAM MEMBER)

PI - L.A. FRANK U OF IOWA

IOWA CITY. IA

DI - J.D. CRAVEN U UF IDWA

IOWA CITY. IA

OI - D.M. YEAGER U OF IOWA

IDWA CITY. IA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF ONE LOW-ENERGY PROTON AND DIFFERENTIAL ENERGY ANALYZER (LEPEDEA) ORIENTED PERPENDICULAR TO THE SATELLITE SPIN AXIS. THE LEPEDEA MEASURED PROTONS AND ELECTRONS IN 16 CHANNELS OVER AN ENERGY RANGE OF 50 EV TO 50 KEV. THE EXPERIMENT SURVEYED THE PARTICLE ENVIRONMENT OF THE MAGNETOSPHERE, ESPECIALLY NEAR THE POLAR CUSPS .

----- HAWKEYE 1. GURNETT

EXPERIMENT NAME- ELF/VLF RECEIVERS

NSSDC ID- 74-040A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 06/03/74. EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR. TL=TEAM LEADER DI-OTHER INVESTIGATOR. TM-TEAM MEMBER)

PI - D.A. GURNETT U OF IOWA IOWA CITY. IA

IOWA CITY. IA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF TWO DETECTORS -- (1) A 16-CHANNEL SPECTRUM ANALYZER COVERING THE FREQUENCY RANGE FROM 10 HZ TO 178 KHZ WITH LOGARITHMIC SPACING AND (2) A WIDE-BAND RECEIVER COVERING THE FREQUENCY RANGE FROM 10 HZ TO 10 KHZ. THE SIGNALS FROM THE FIRST DETECTOR WERE SENT TO GROUND STATIONS DIRECTLY IN DIGITAL FORM, WHEREAS THE OUTPUT FROM THE SECOND DETECTOR WAS TRANSMITTED TO GROUND STATIONS IN ANALOG FORM. BOTH DETECTORS WERE USED IN CONNECTION WITH EITHER OF TWO ANTENNAS -- AN ELECTRIC DIPOLE ABOUT 42 METERS IN LENGTH FROM TIP TO TIP AND A SEARCH COIL ANTENNA. THE EXPERIMENT MEASURED PLASMA WAVES IN THE MAGNETOSPHERE ESPECIALLY NEAR THE PGLAR CUSPS .

SPACECRAFT/EXPERIMENT CHARACTERISTICS

----- HAWKEYE 1. VAN ALLEN ----

EXPERIMENT NAME - TRIAXIAL FLUXGATE MAGNETOMETER

NSSDC ID- 74-040A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY

AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 07/20/75.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER

OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.A. VAN ALLEN U DF IOWA

IOWA CITY. IA

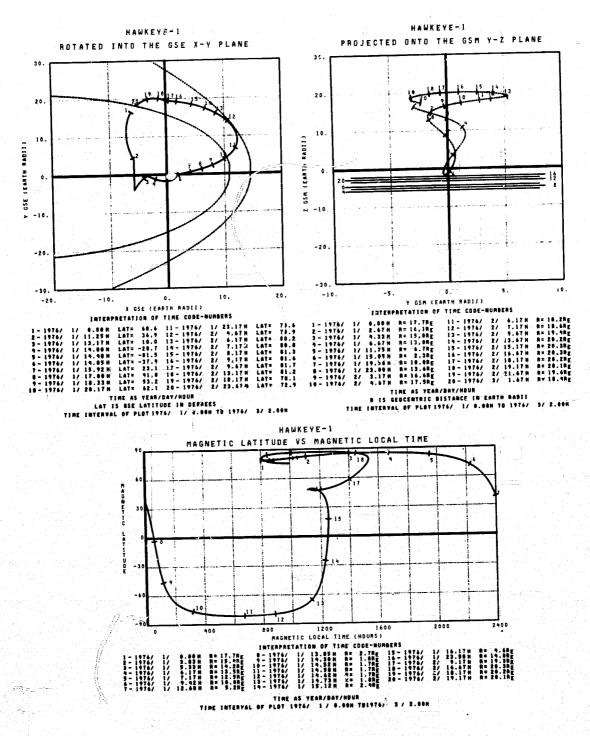
OI - M.N. OLIVEN U OF IOWA

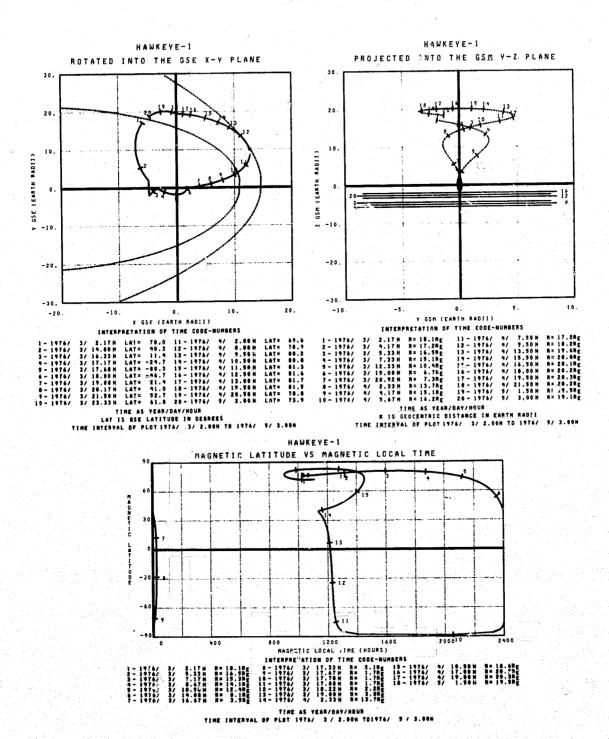
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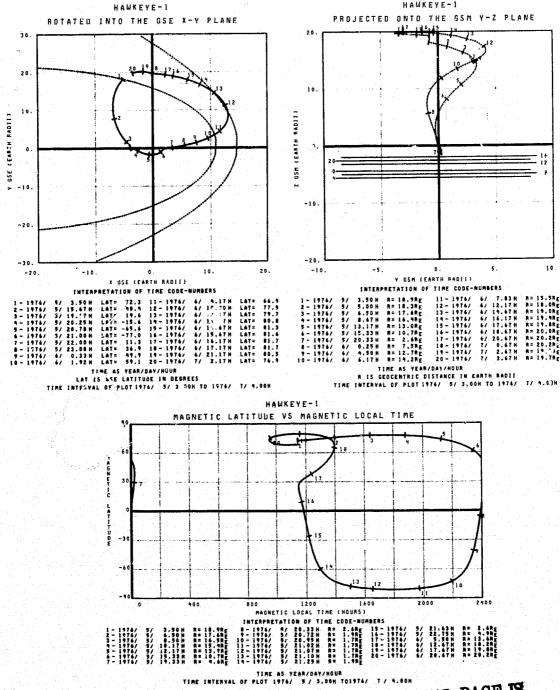
OI - L.J. CAHILL, JR.U OF MINNESOTA MINNEAPOLIS. MN

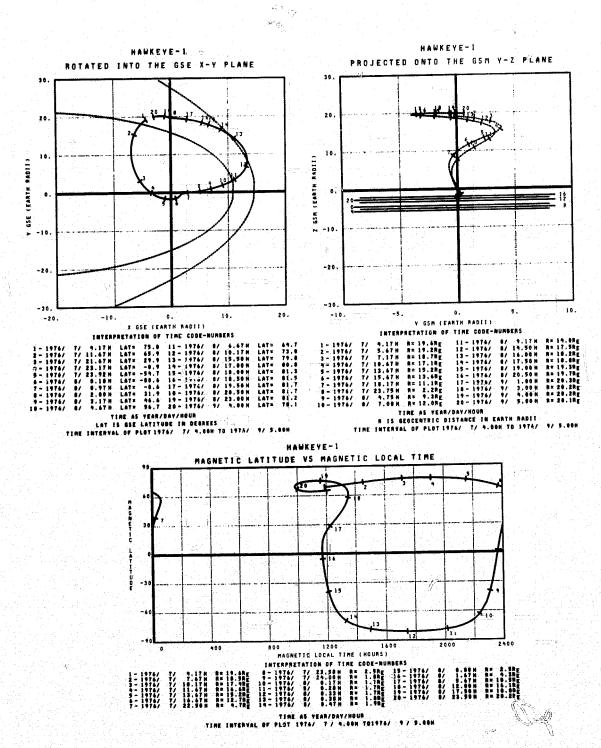
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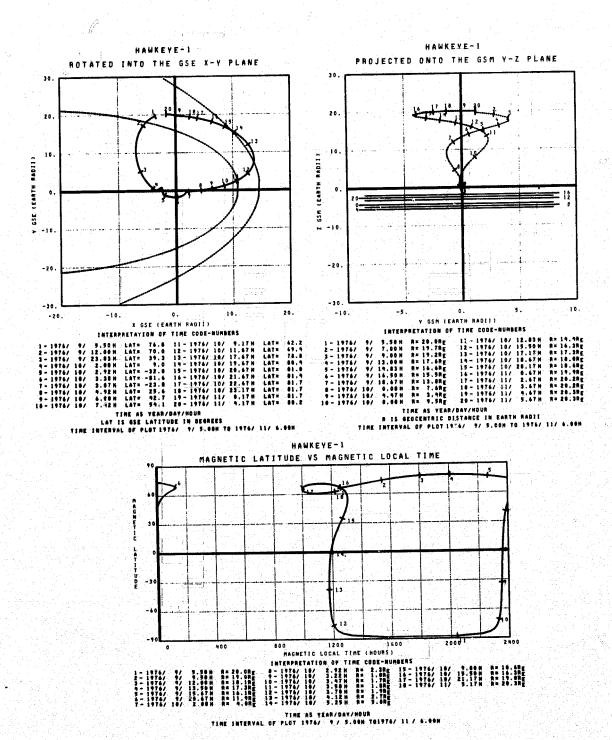
THIS EXPERIMENT CONSISTED OF A TRIAXIAL FLUXGATE MAGNETOMETER CAPABLE OF OPERATION AT TWO LEVELS, LOW GAIN AND HIGH GAIN. IN THE HIGH-GAIN MODE THE MAGNETOMETER RANGE IS FROM ABOUT 0.1 TO 100 GAMMA (STRAY SATELLITE MAGNETIC FIELDS ARE TO BE CONSTRAINED TO LESS THAN 0.1 GAMMA). IN THE LOW-GAIN MODE THE MAGNETOMETER RANGE IS FROM 100 TO ABOUT 1000 GAMMA. THE EXPERIMENT SURVEYED THE MAGNETIC FIELDS IN THE MAGNETOSPHERE, ESPECIALLY NEAR THE POLAR CUSPS.

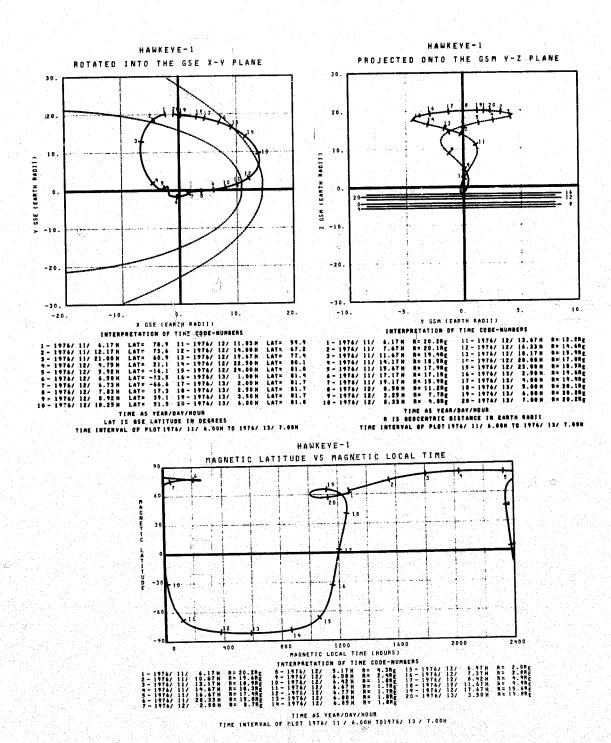


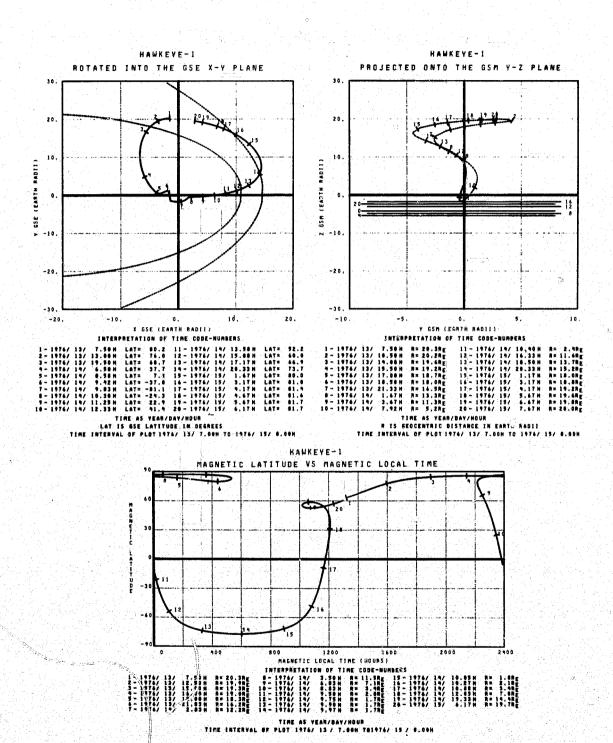


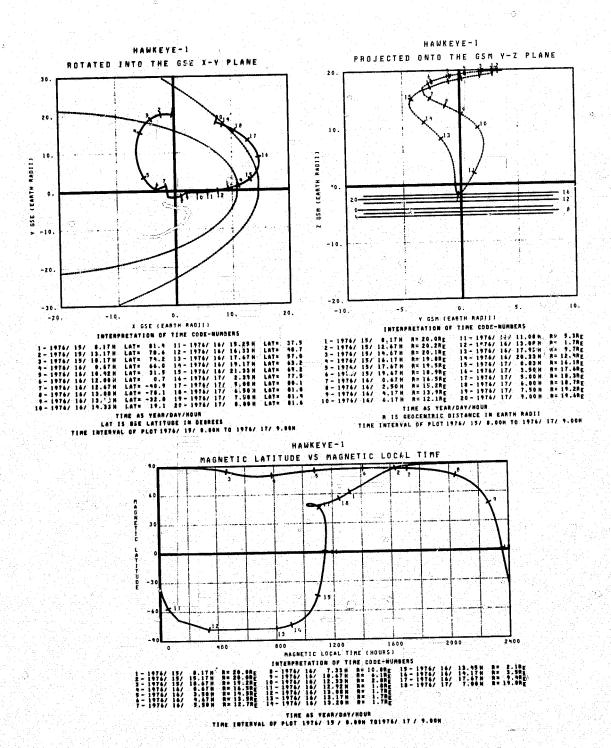


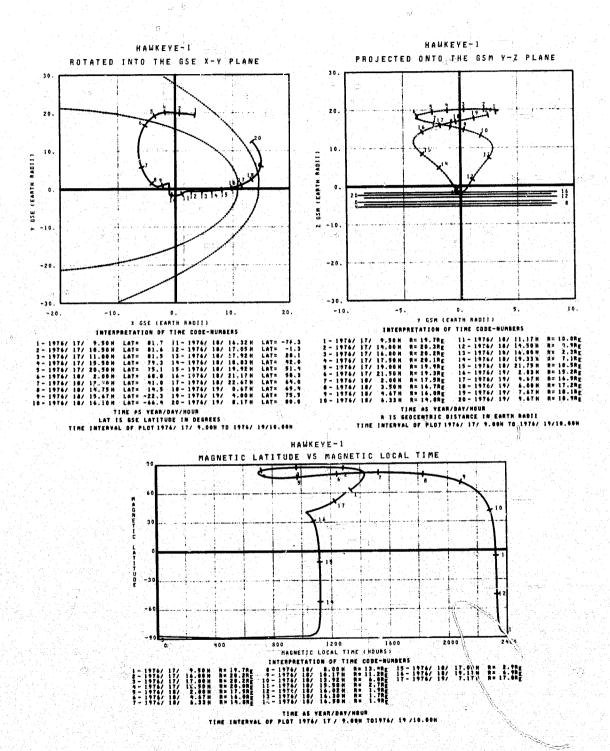


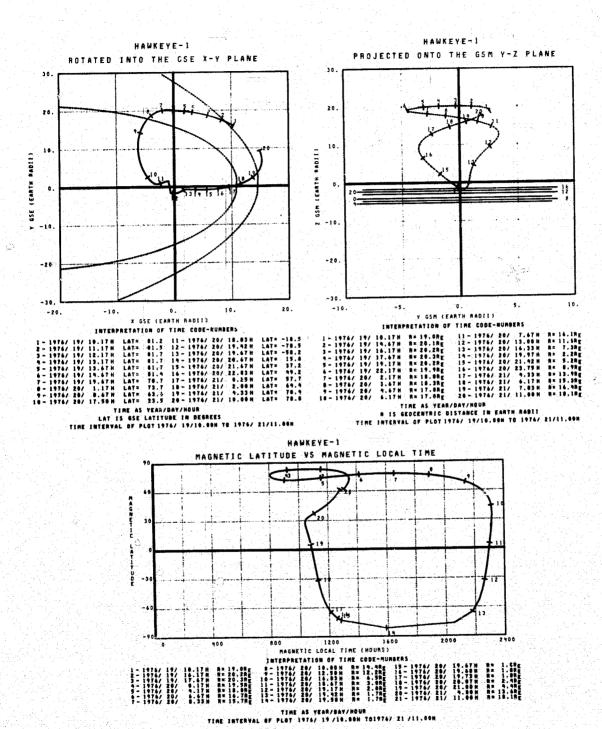


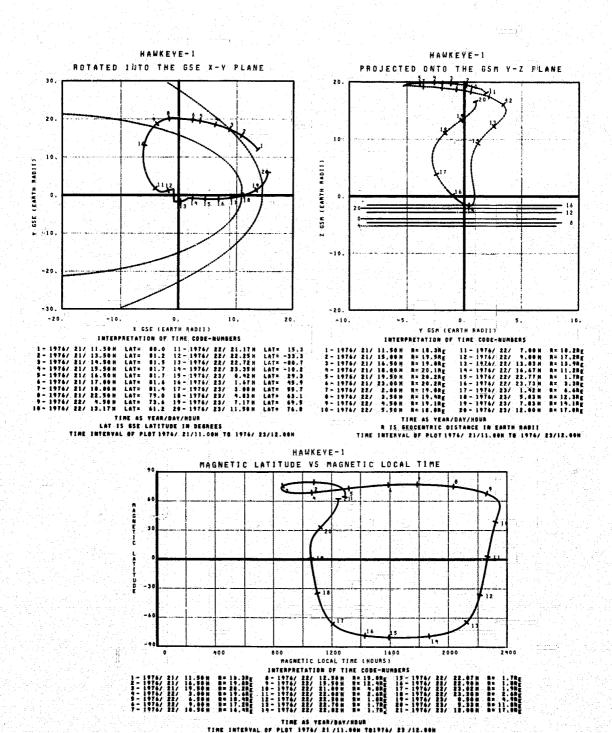




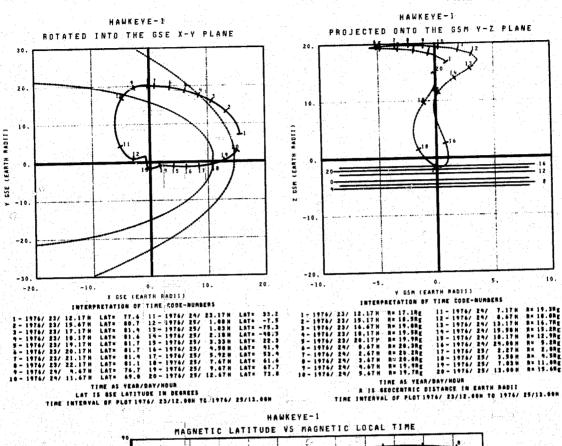


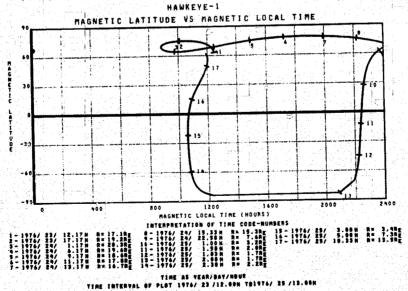


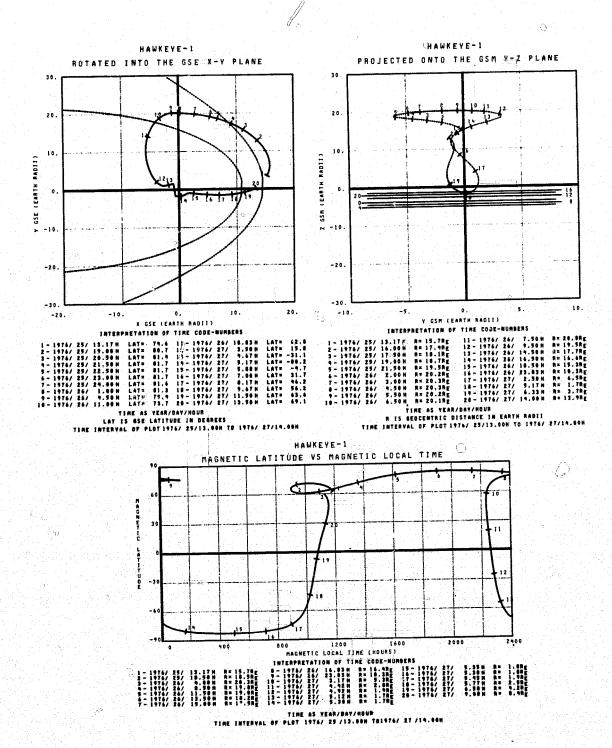




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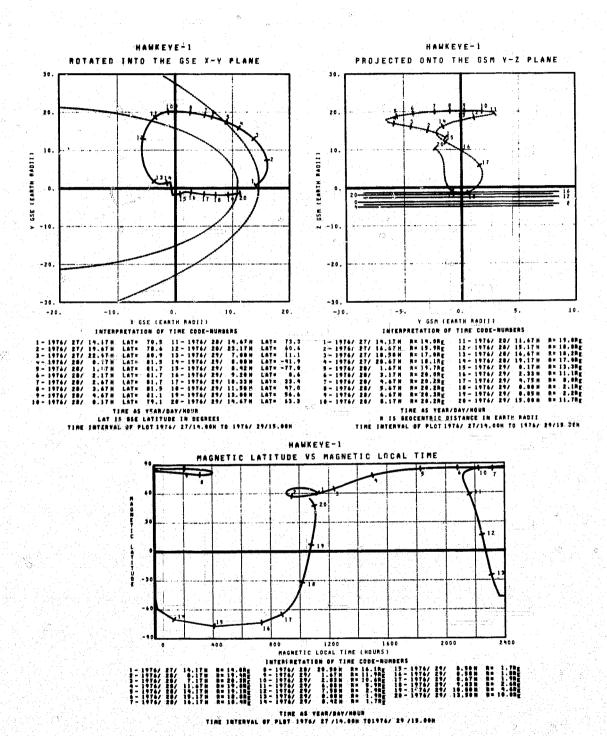






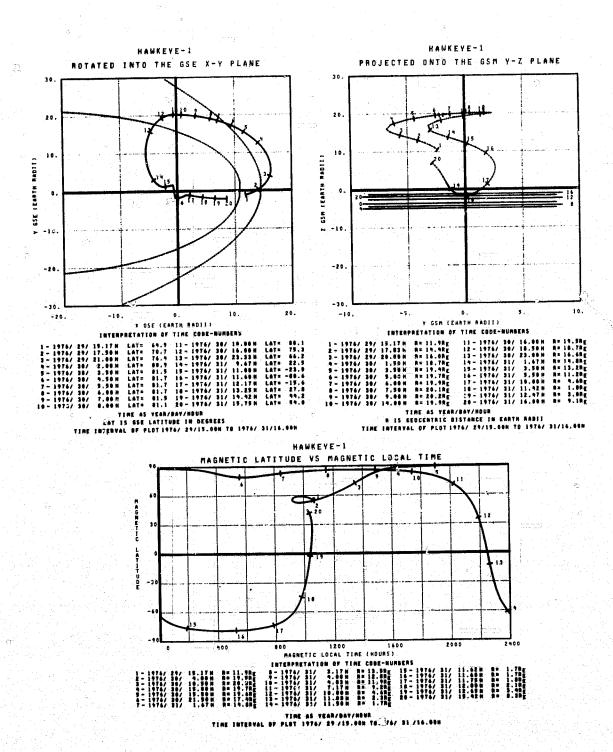
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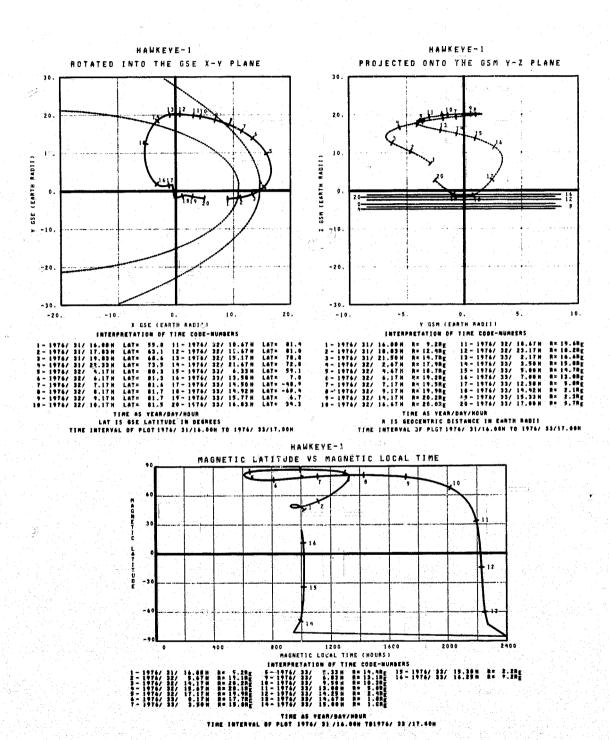


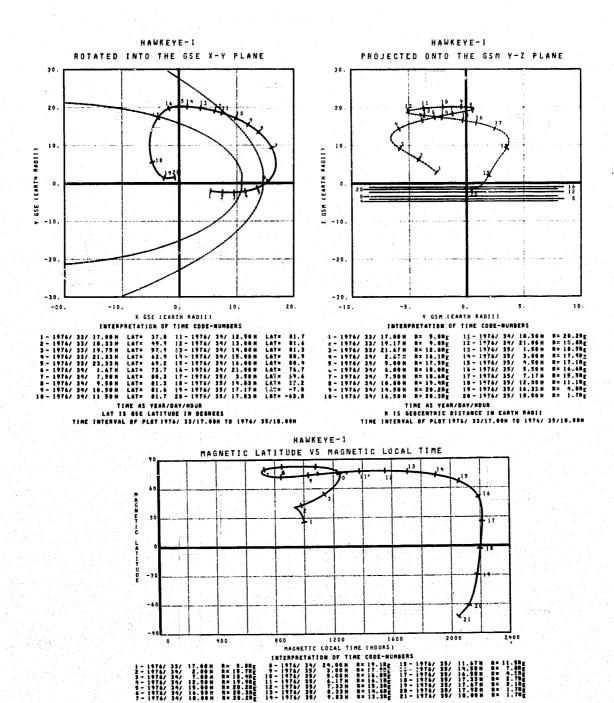
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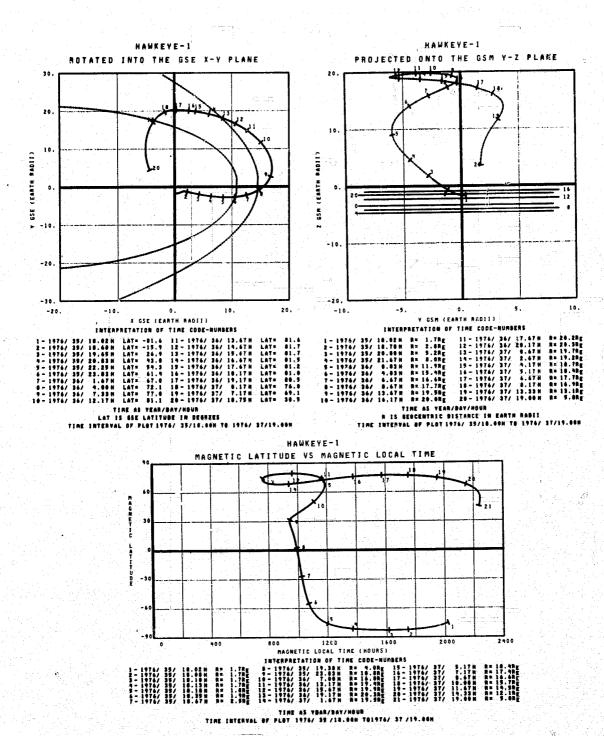


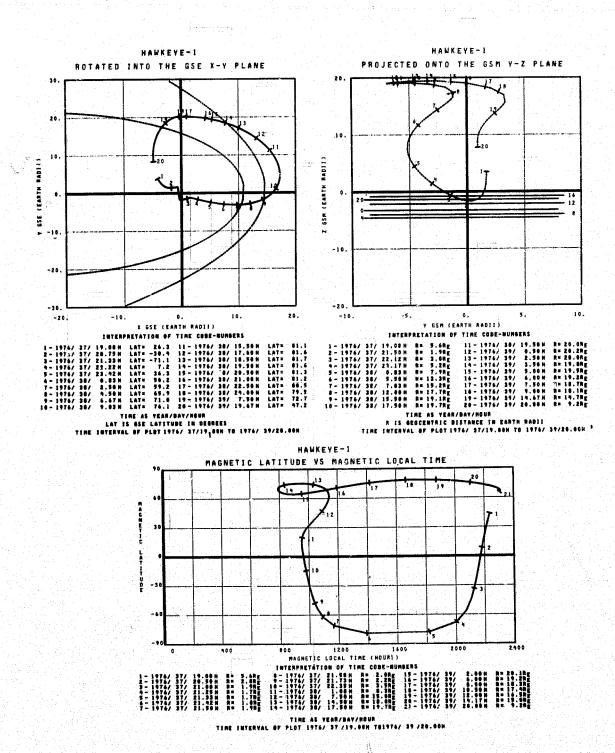
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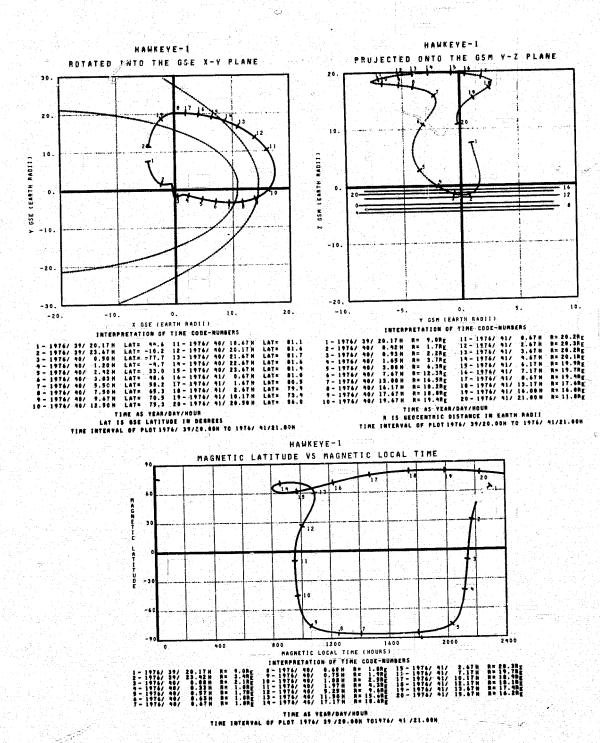


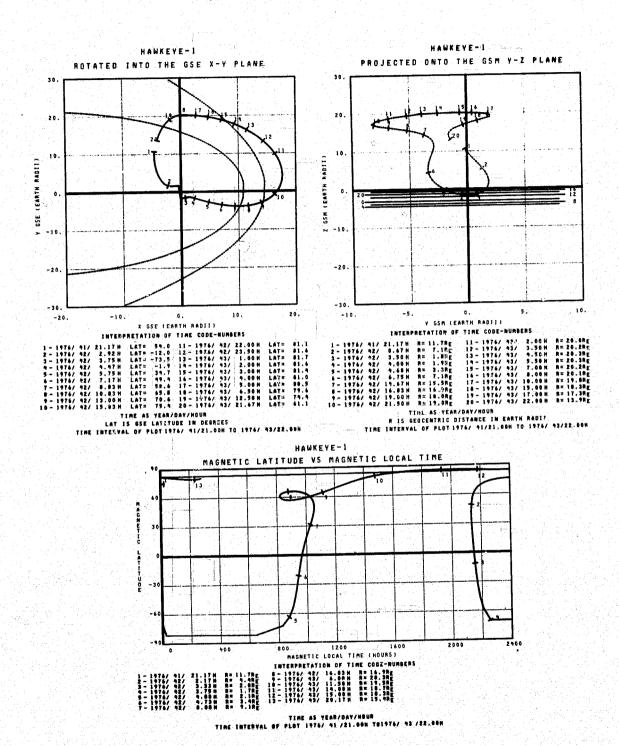
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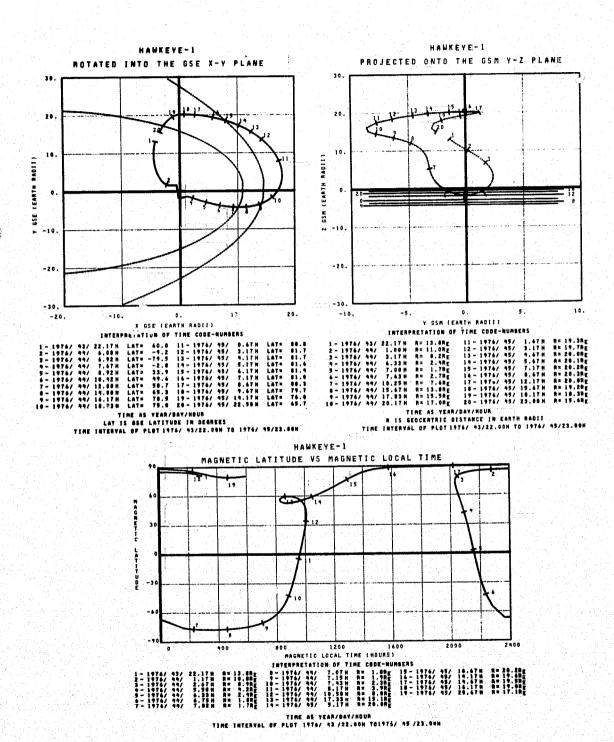


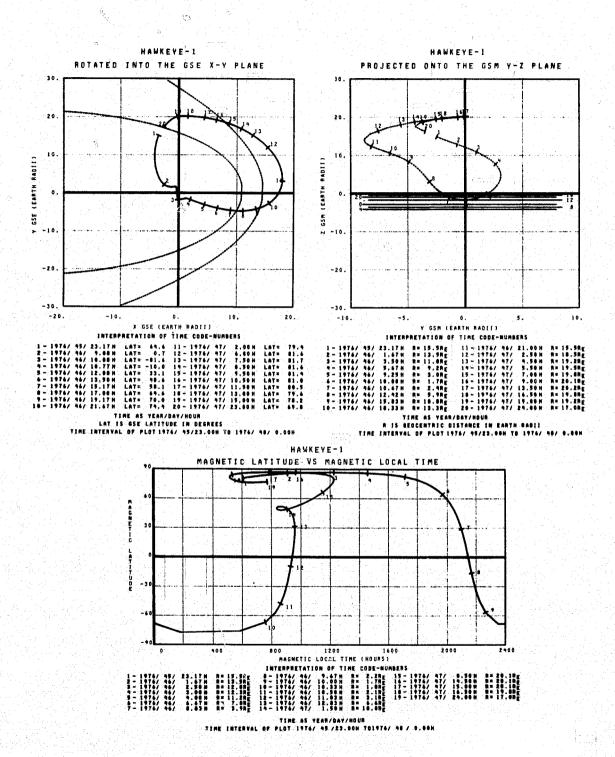


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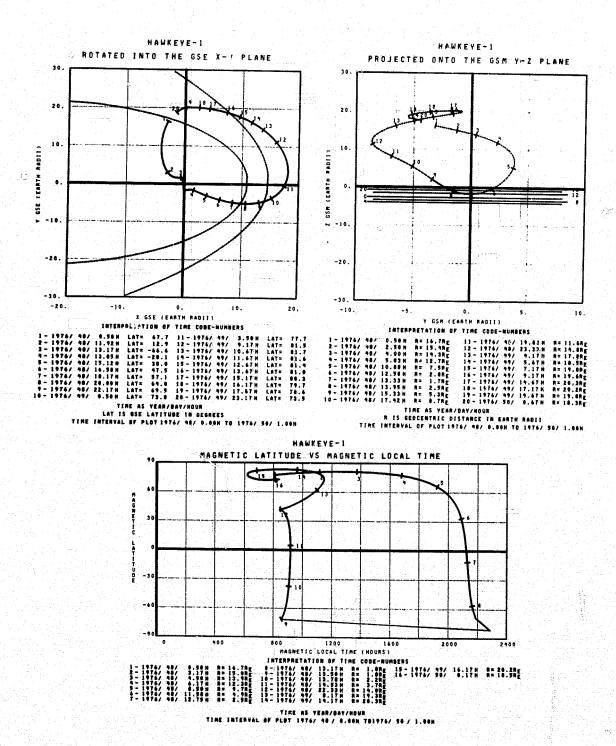


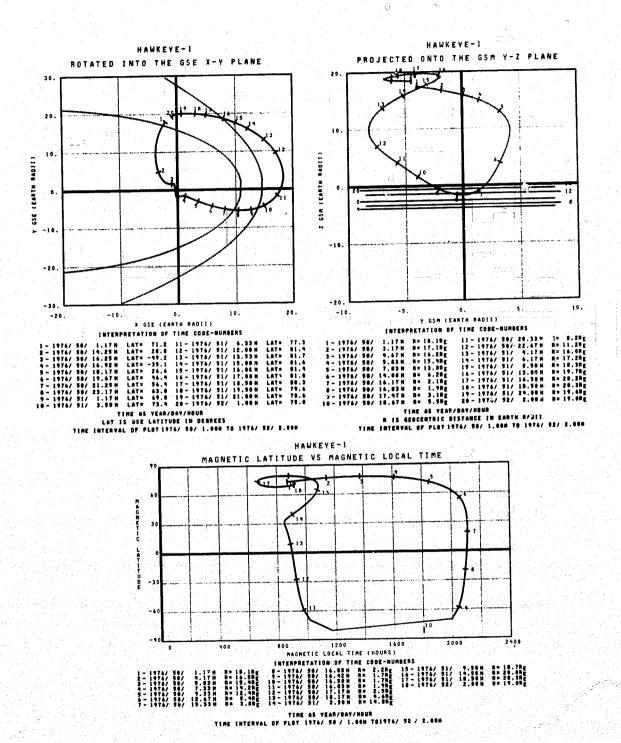


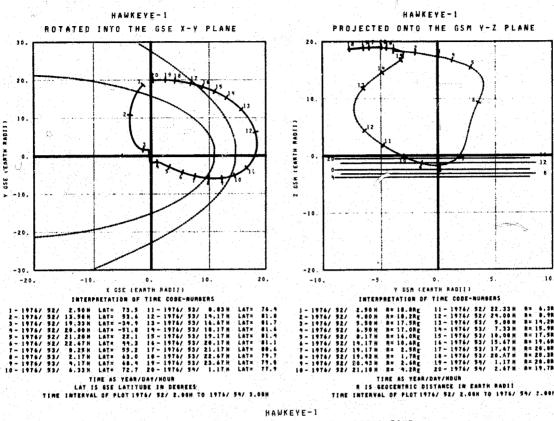


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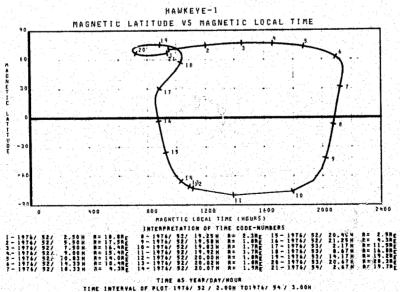
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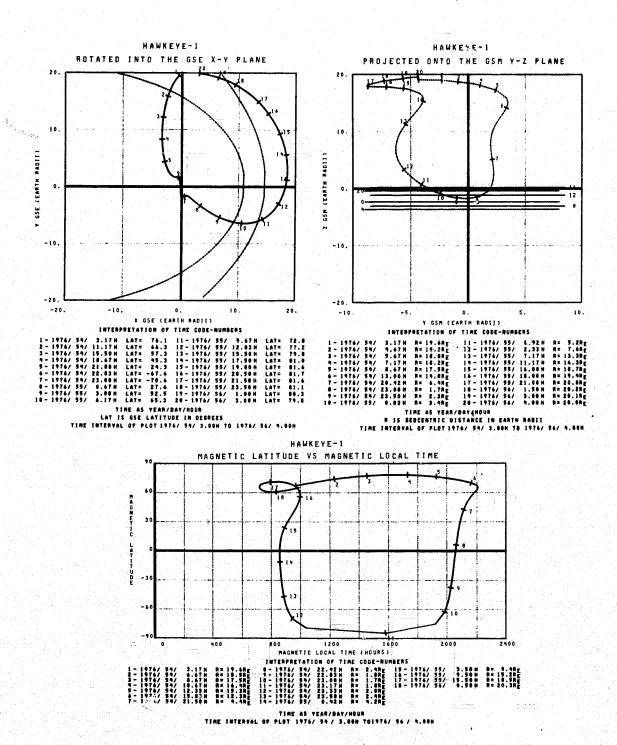


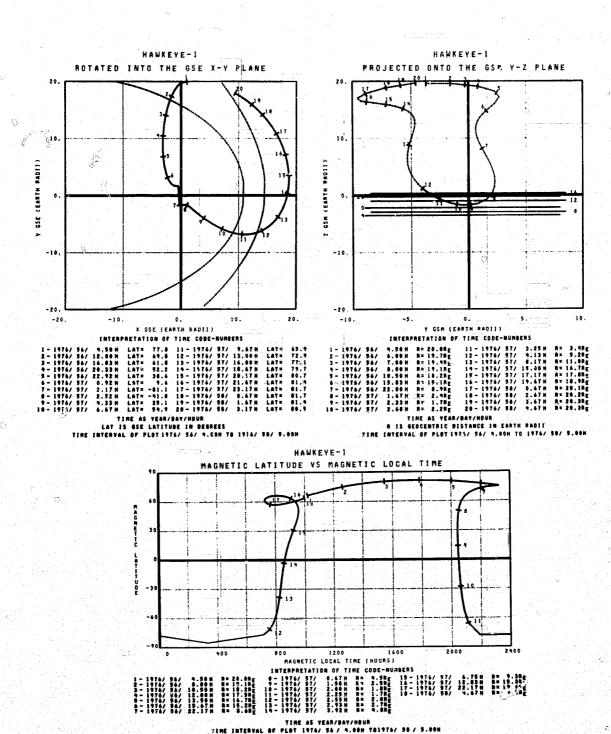


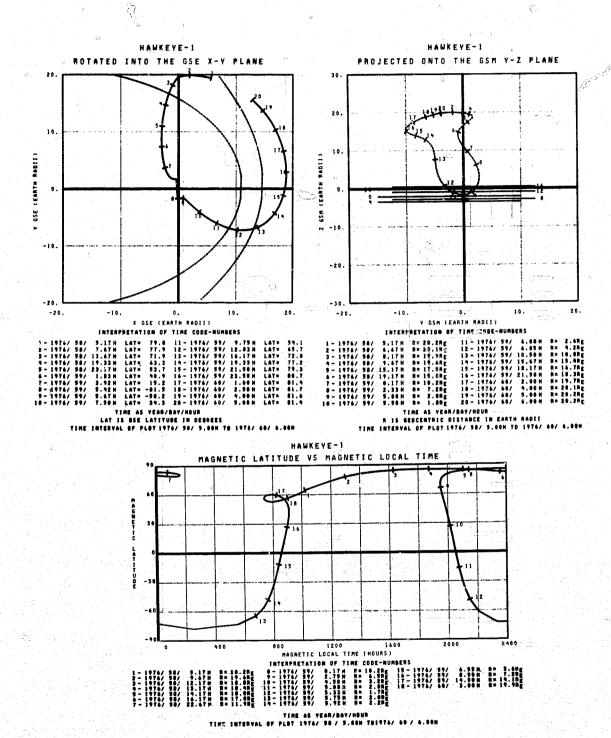


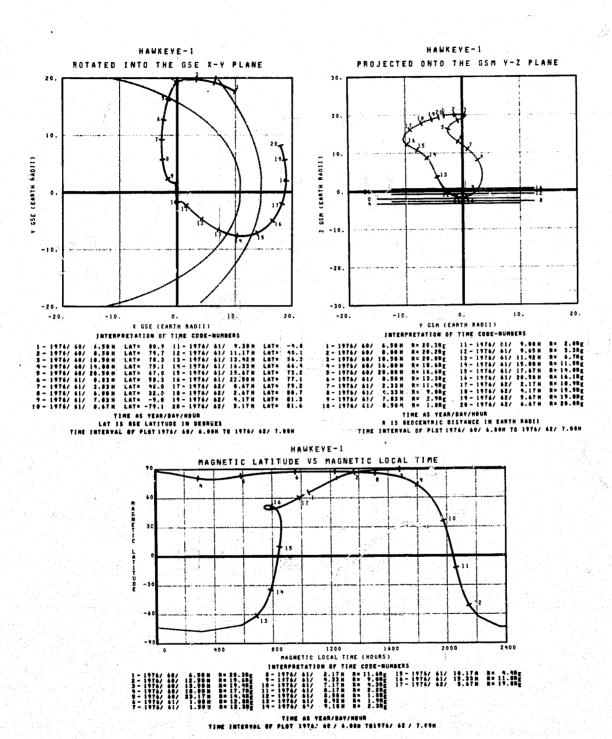
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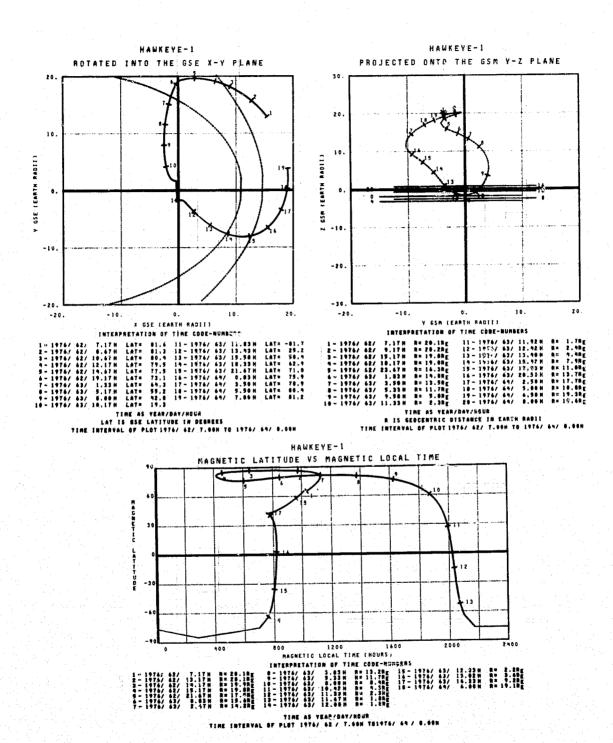


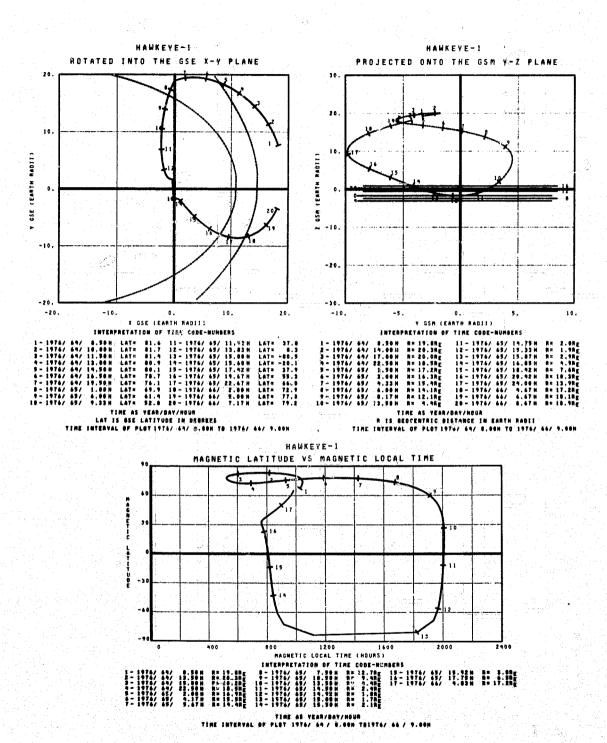


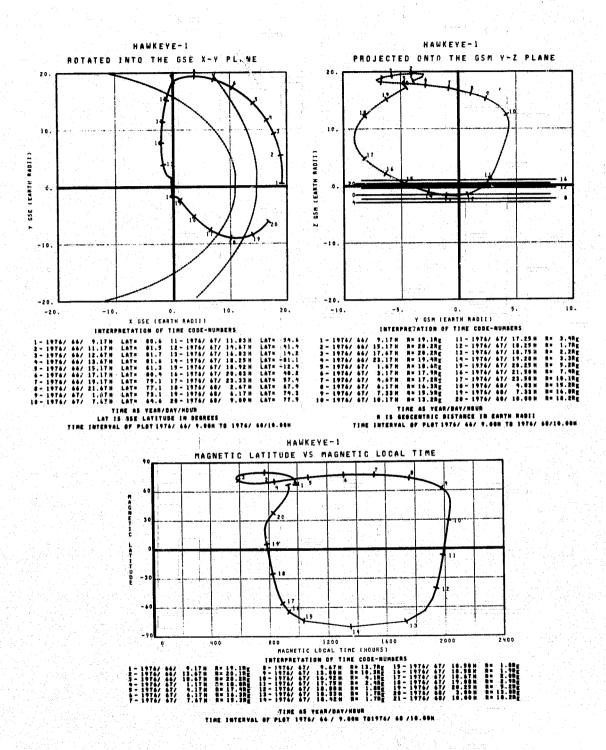




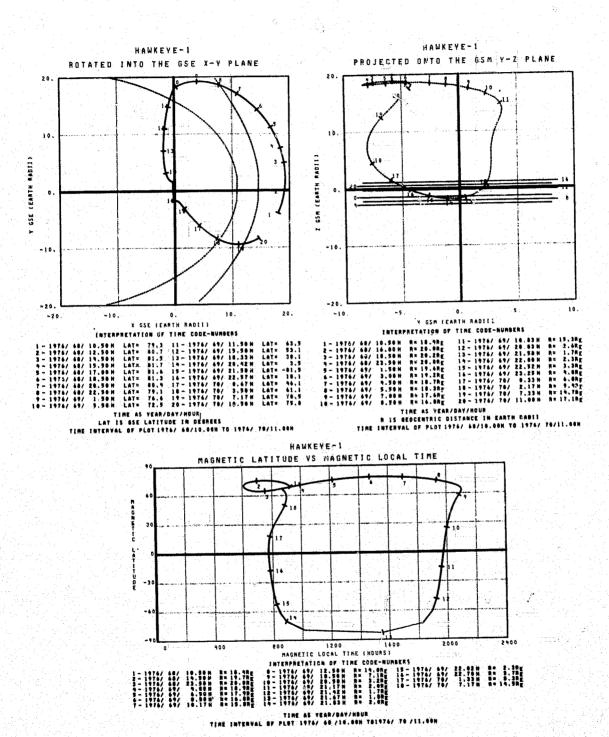


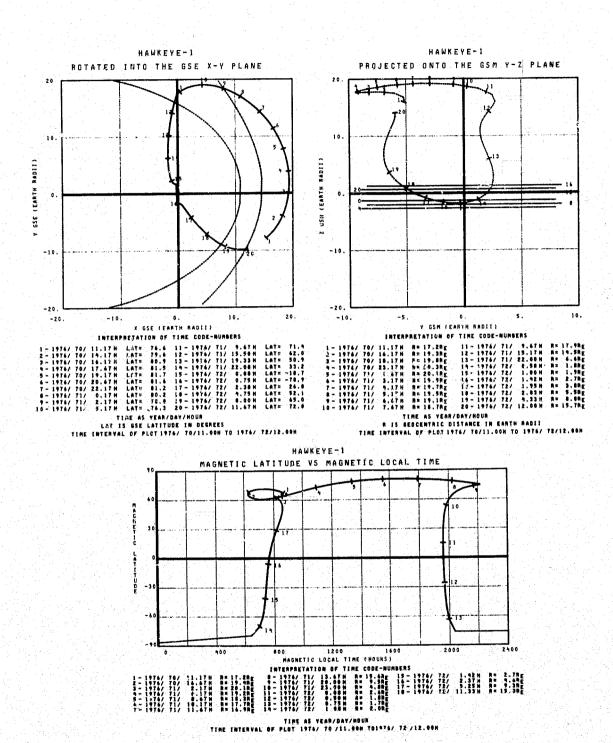


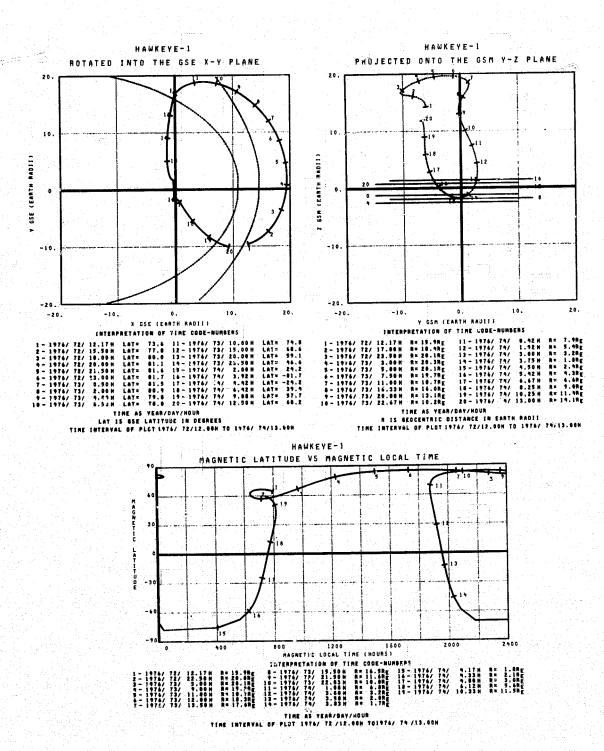


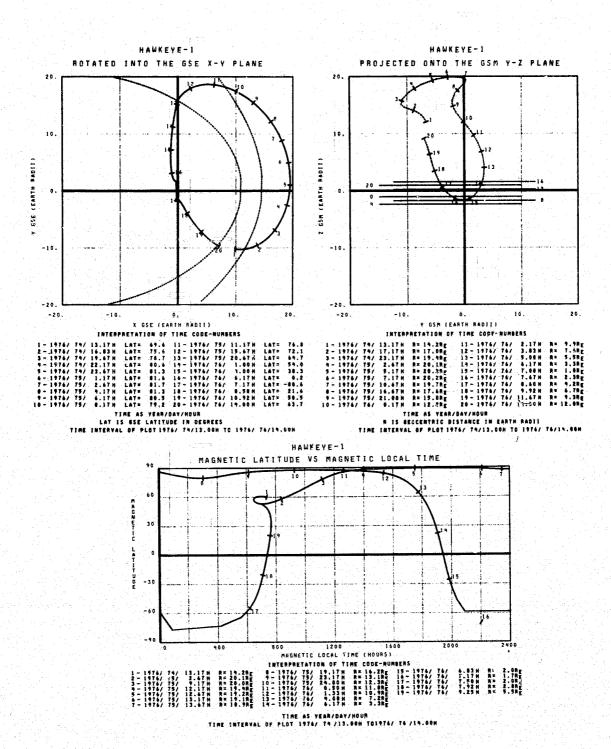


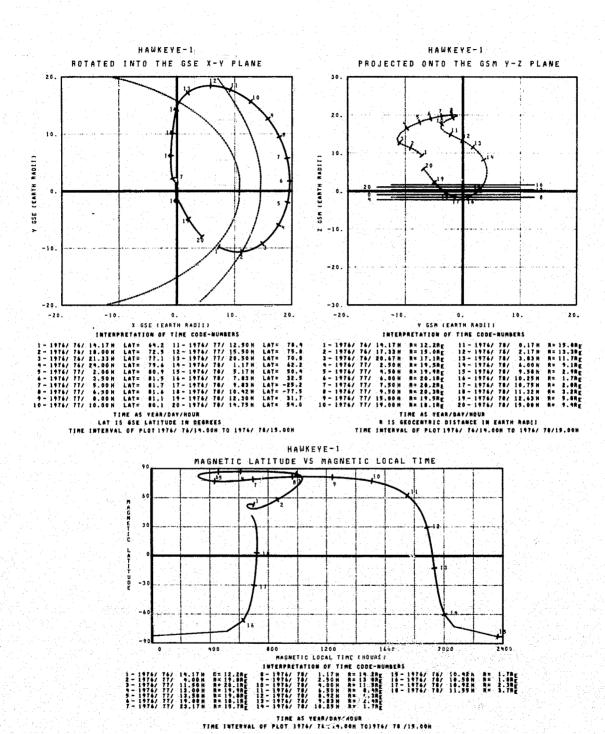
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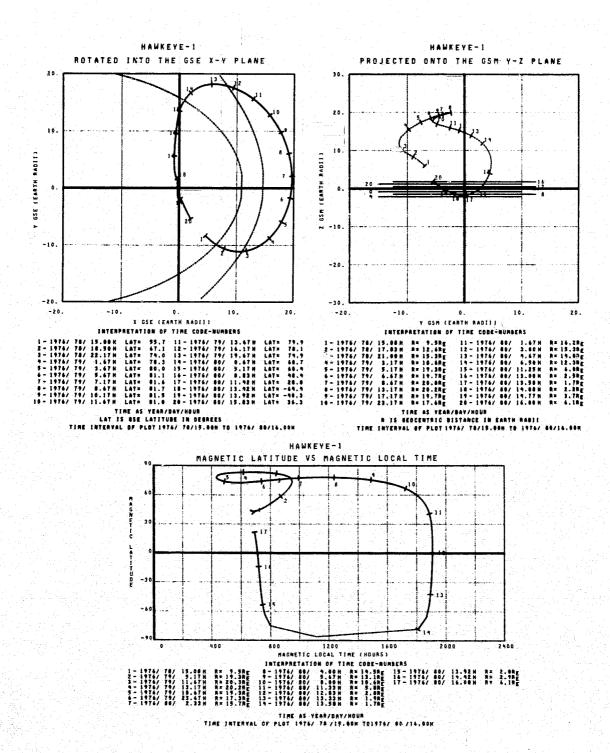


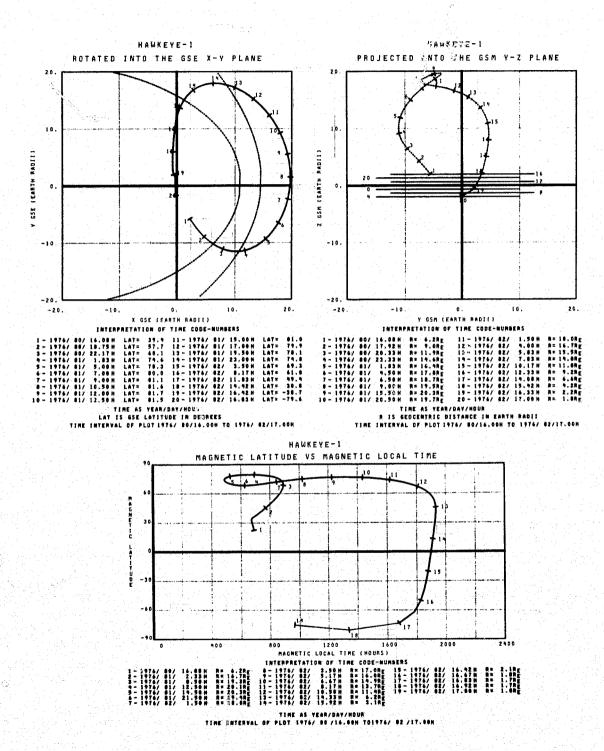


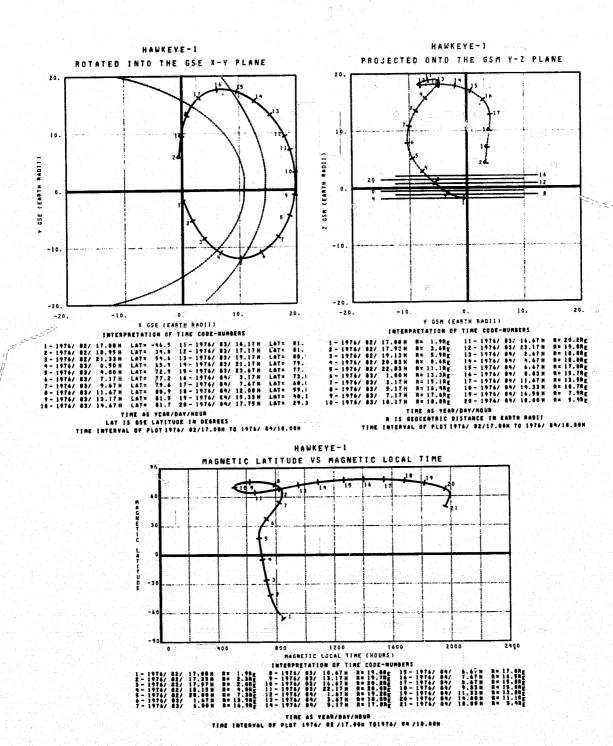




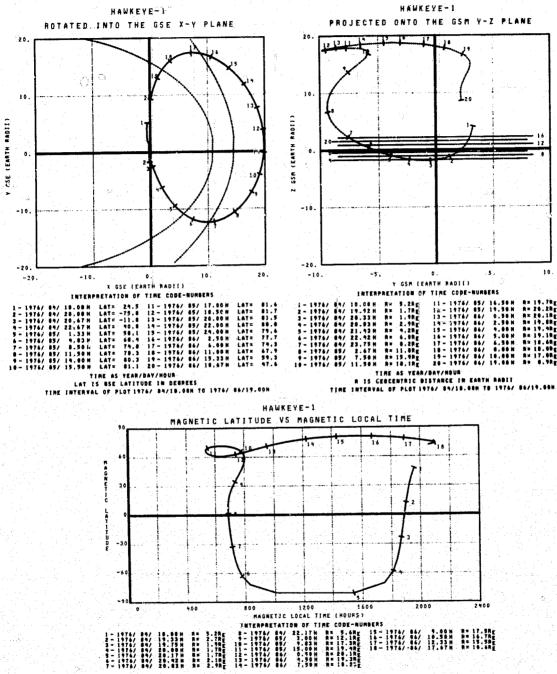




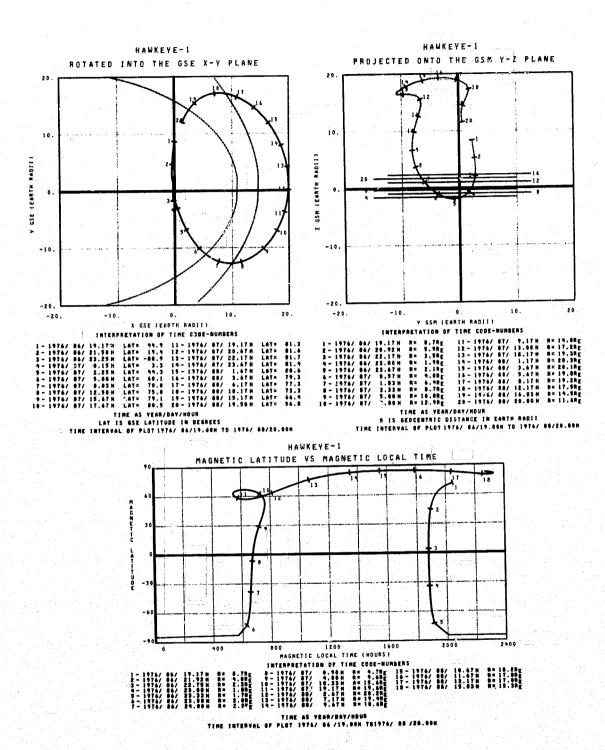


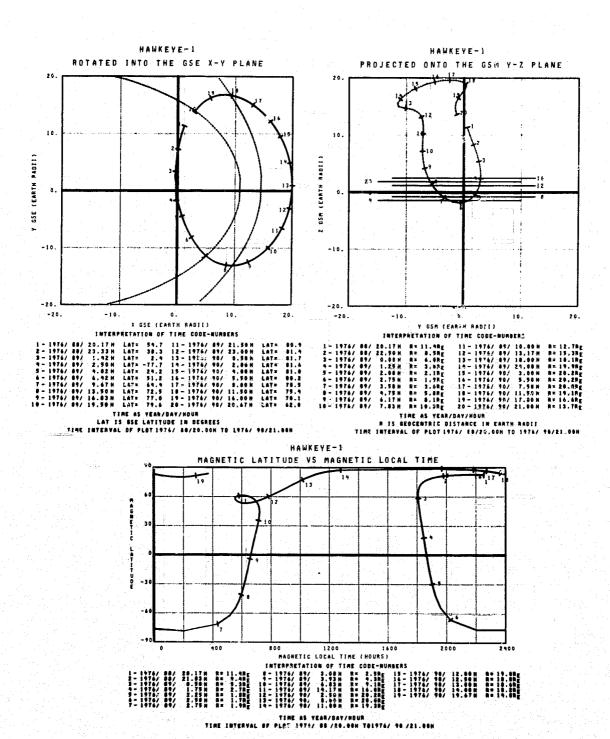




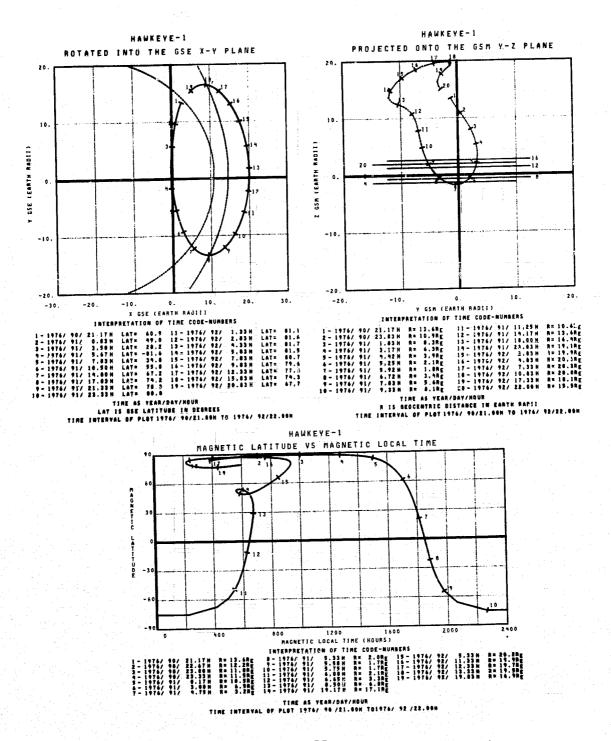


TIRE INTERVAL OF PLOT 1976/ \$9/18.60H TO1976/ 66 /19.00H

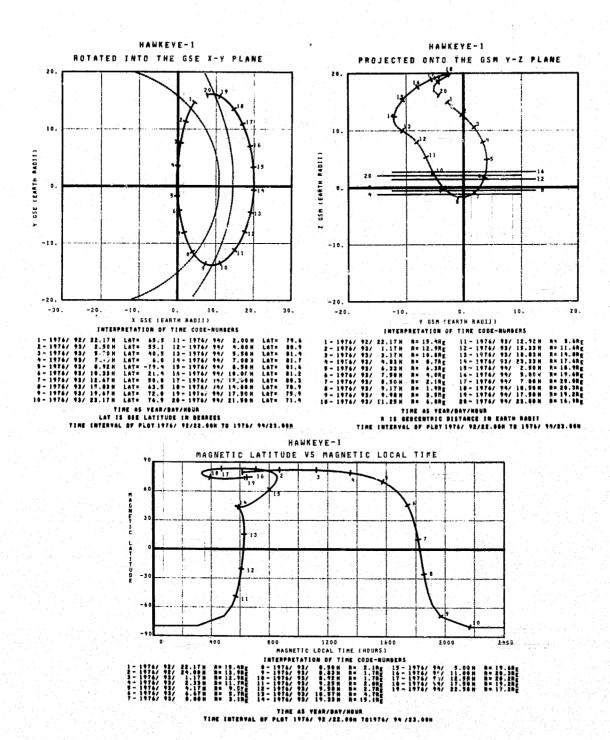


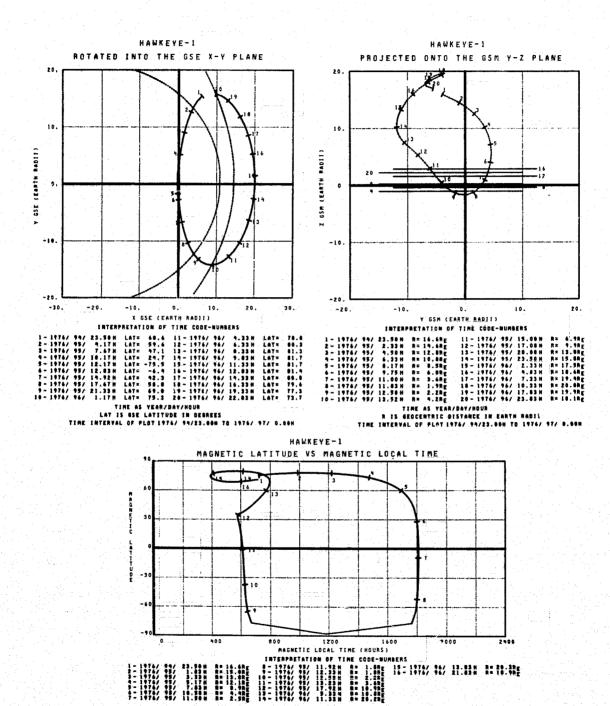


.54

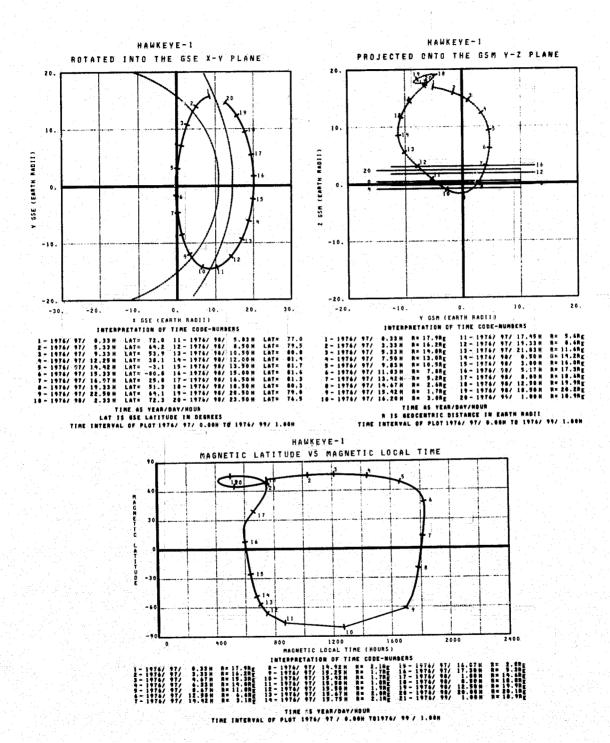


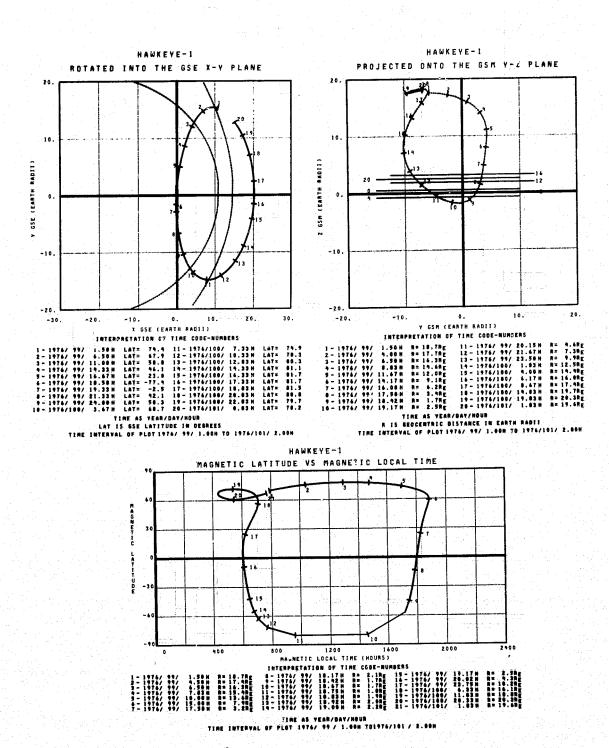
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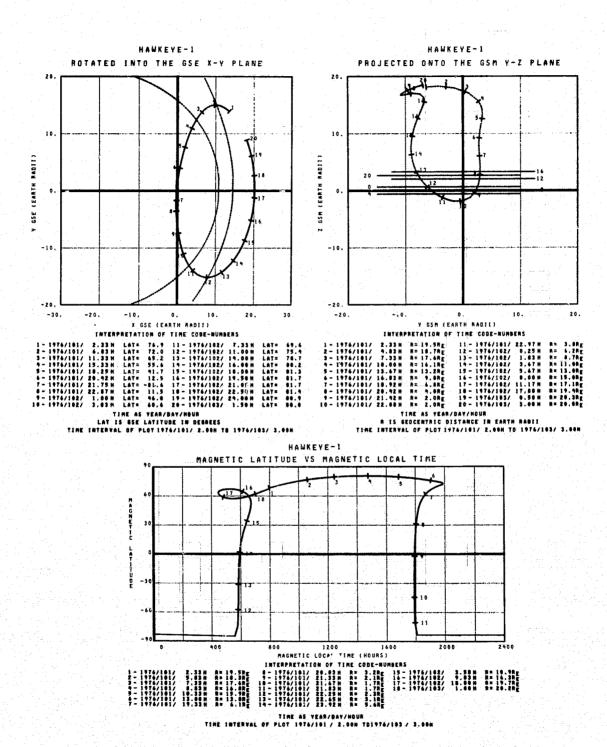


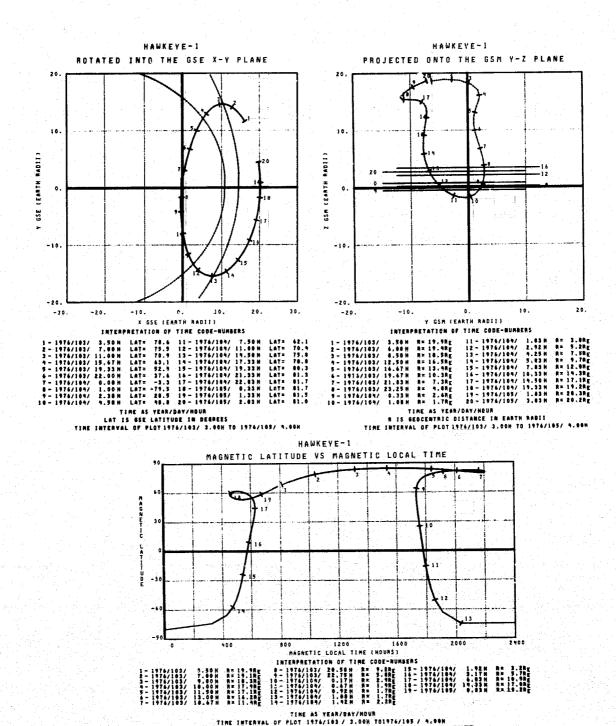


TIME AS VERNYABUR TIME ENTERVAL OF PLOT 3576/ 54/23.000 761976/ 57/0.000

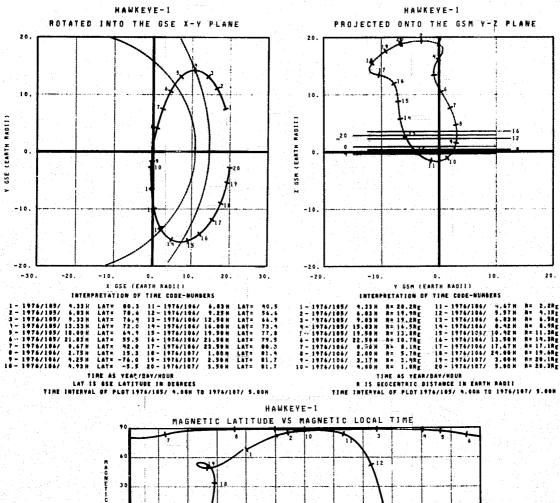


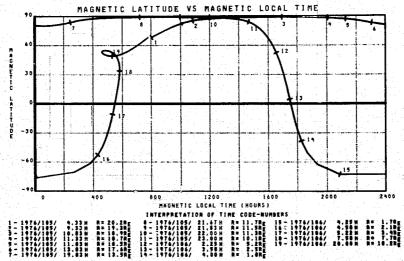






ORIGINAL PAGE IS OF POOR QUALITY





TIME AS VERRIBAY/NOUR
TIME INTEREST OF FLOT 1976/105 / 4.00H TOISTS/107 / 3.00H



HAWKEYE-1

ROTATED INTO THE GSE X-Y PLANE

10.

٥.

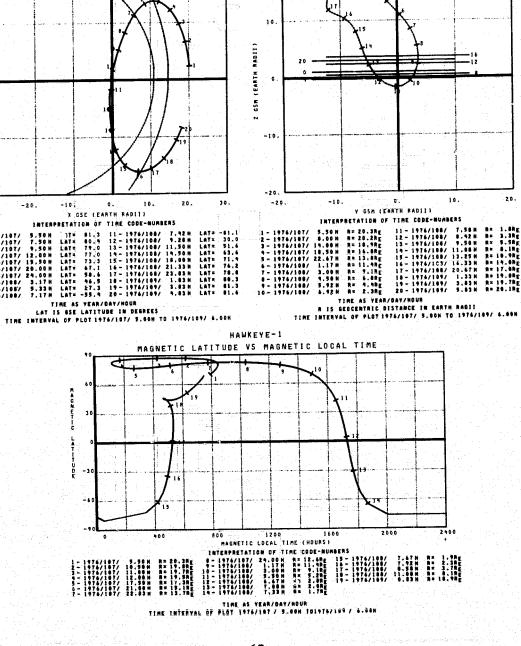
-10.

- 2 n .

-30.

-20.

GSE CEARTH RADILL

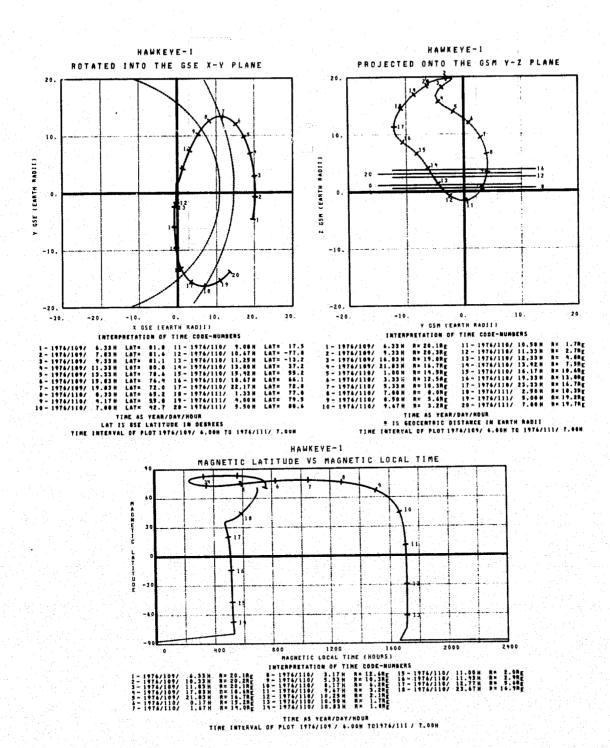


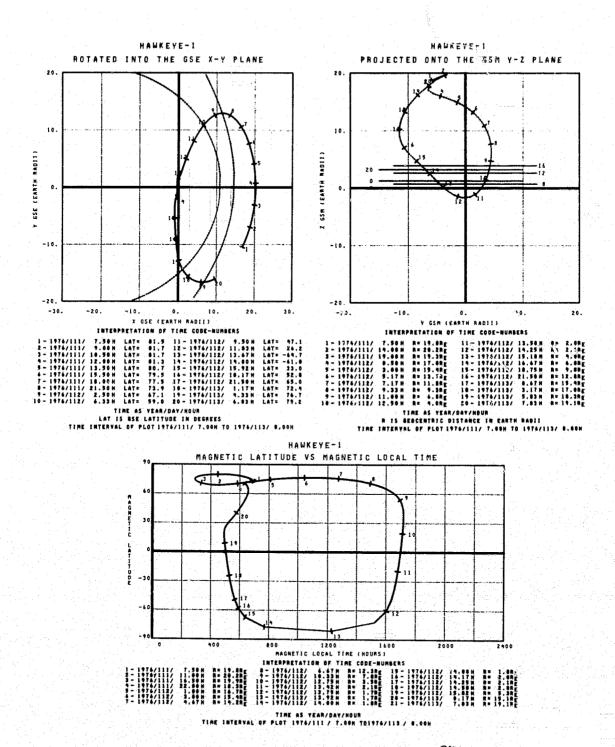
HAWKEYE-1

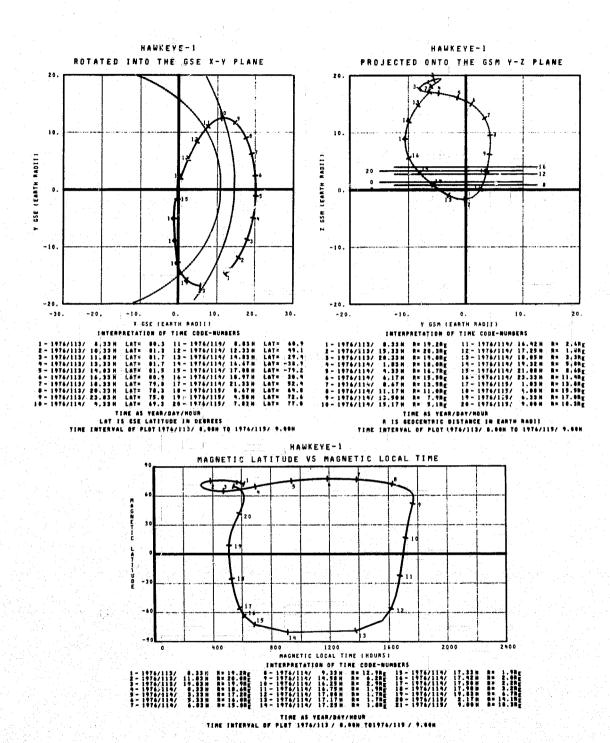
THE GSM Y-Z PLANE

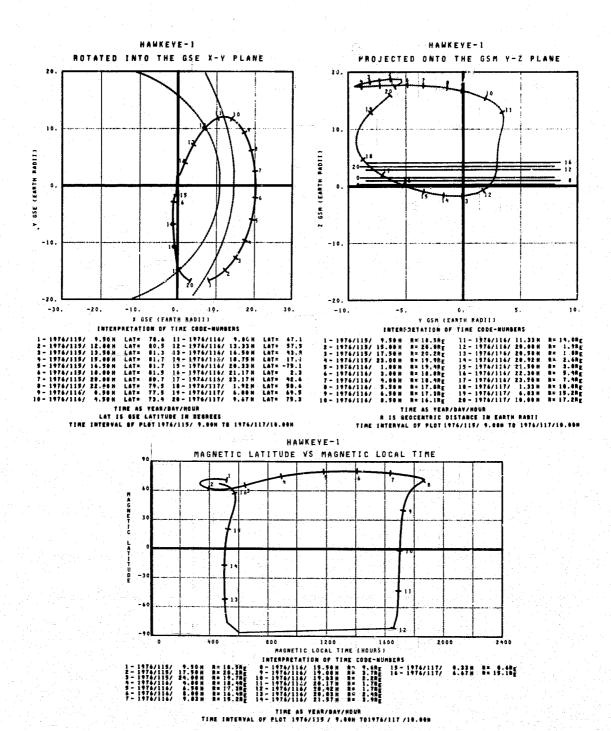
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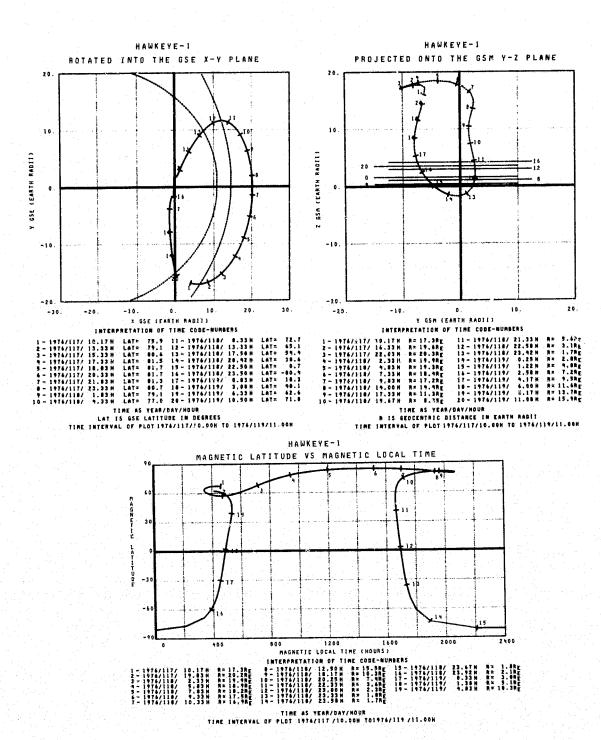
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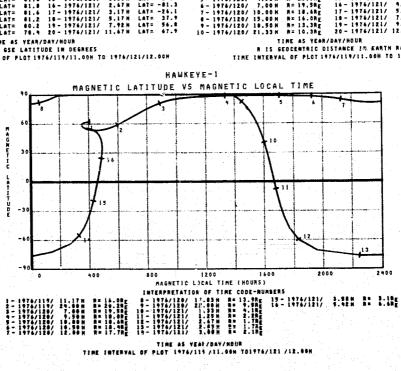


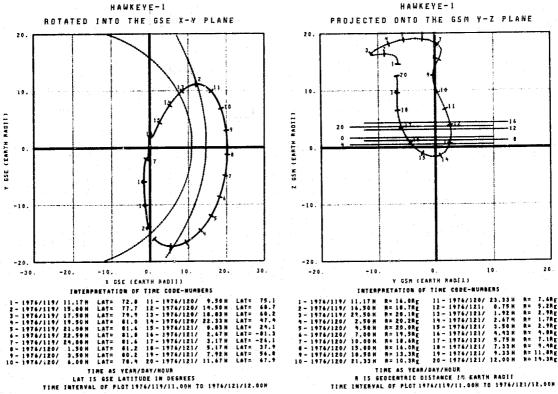


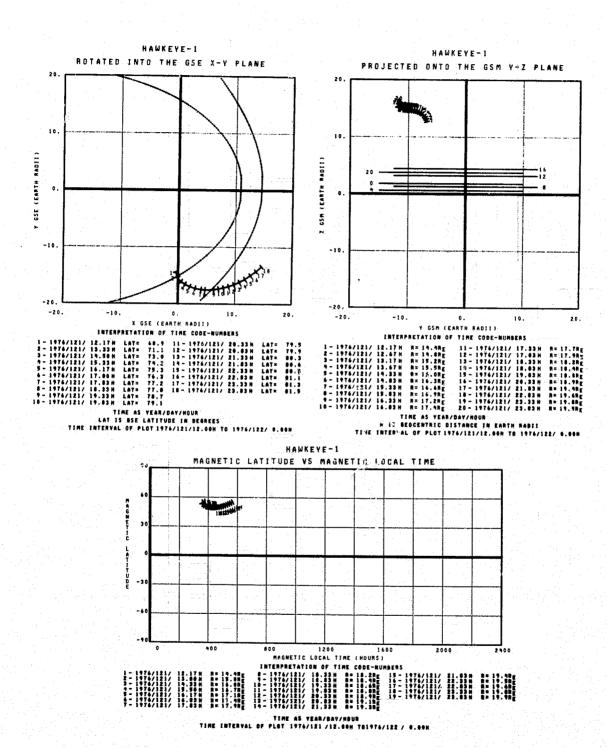


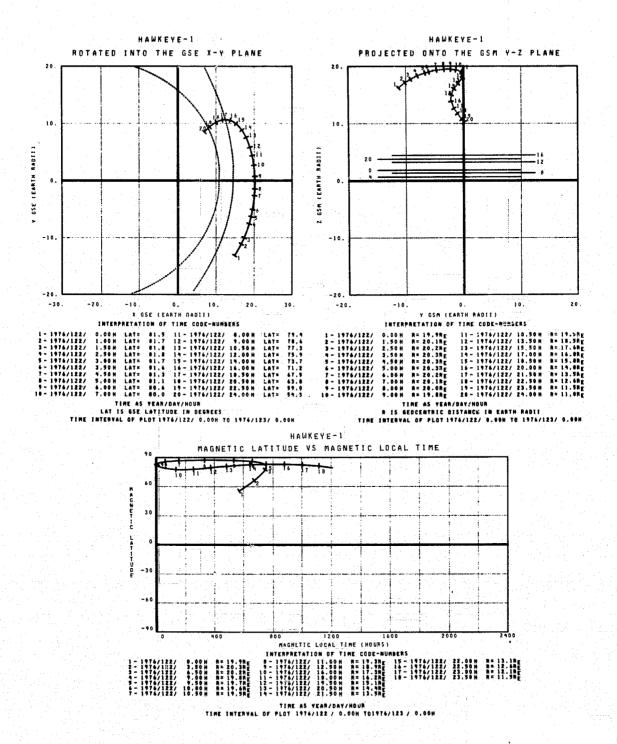


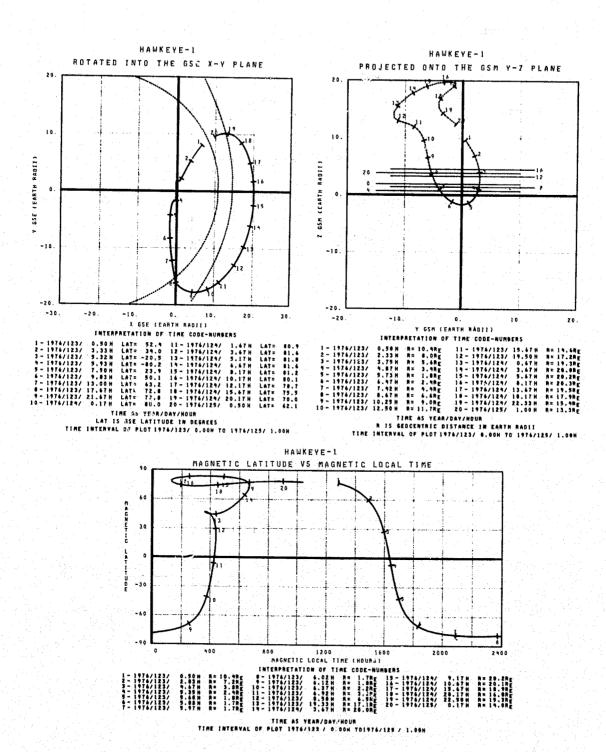


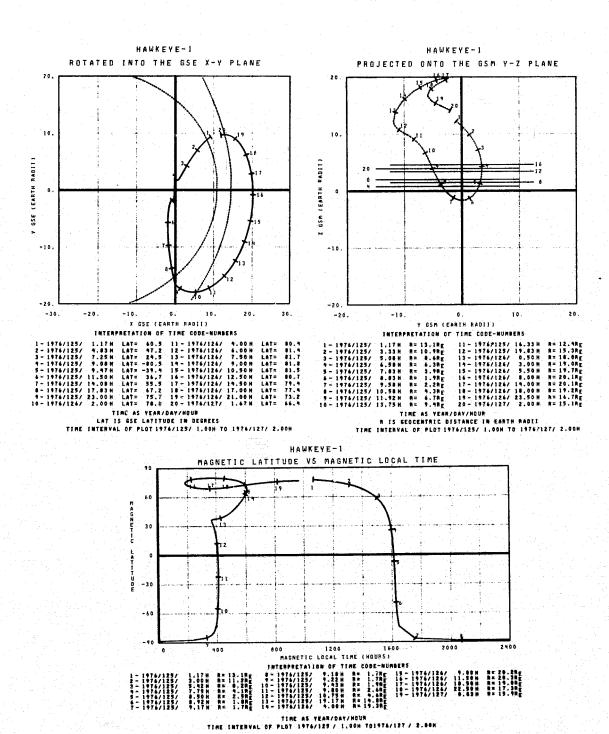


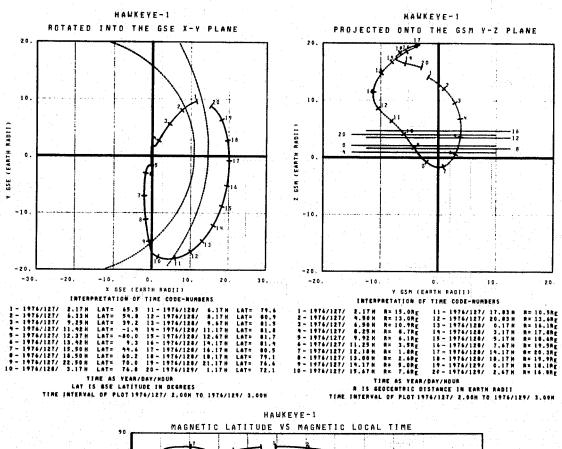


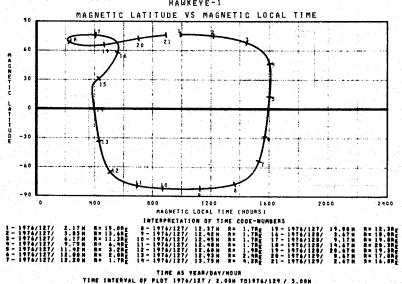




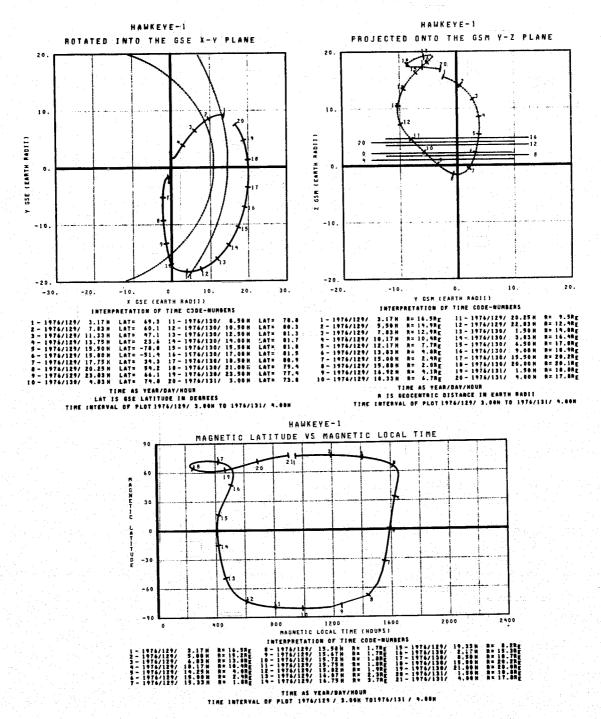


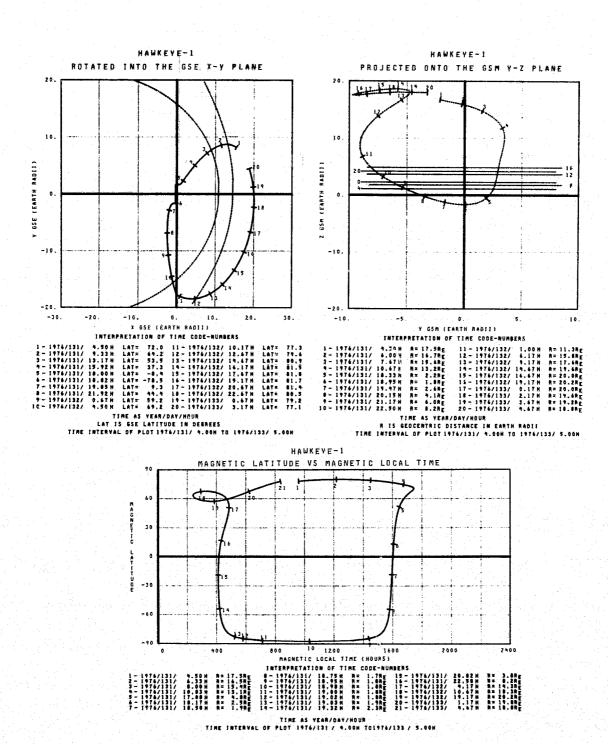


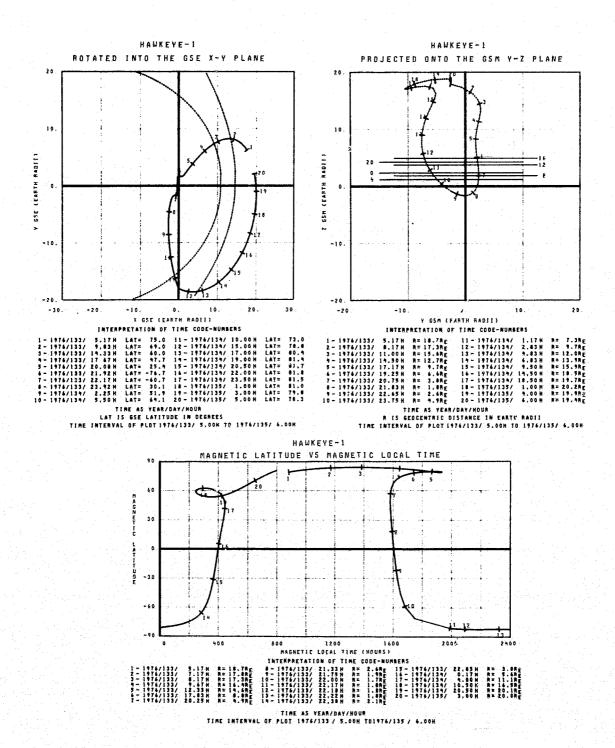


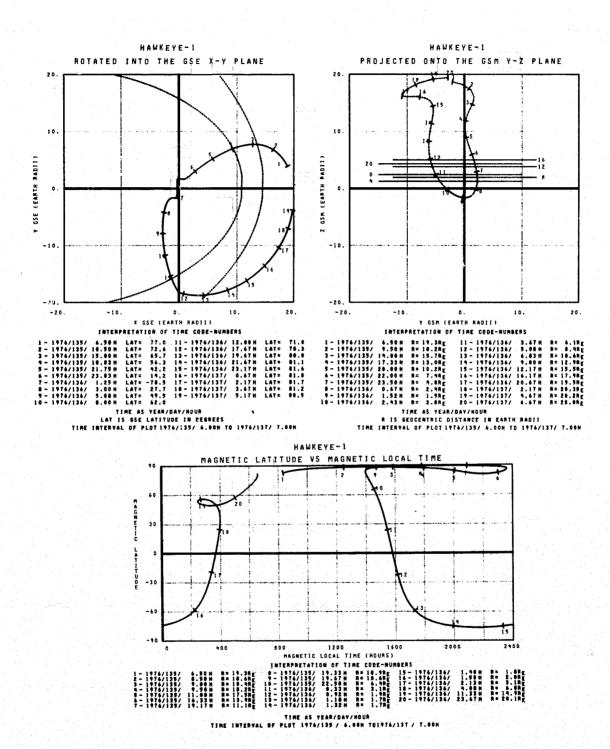


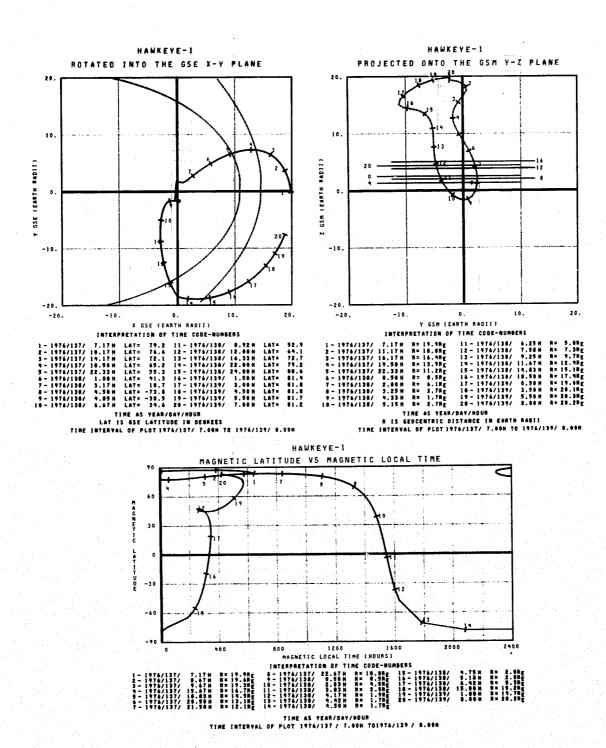


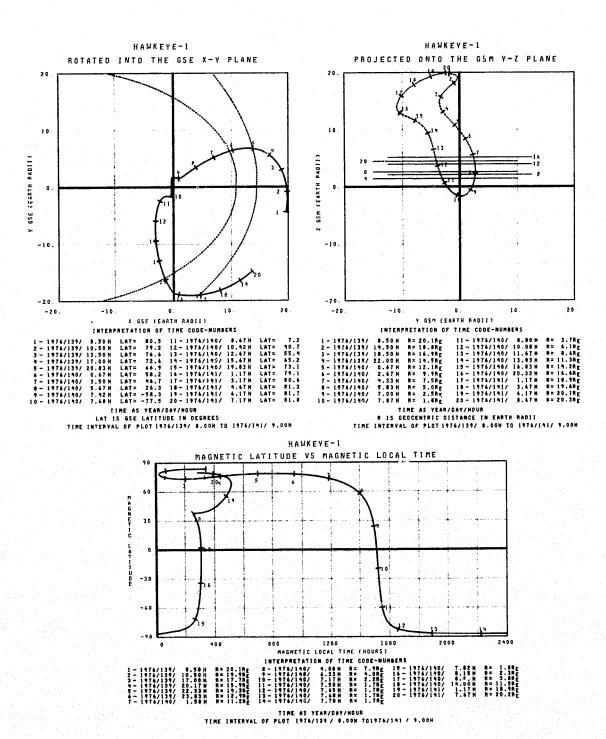


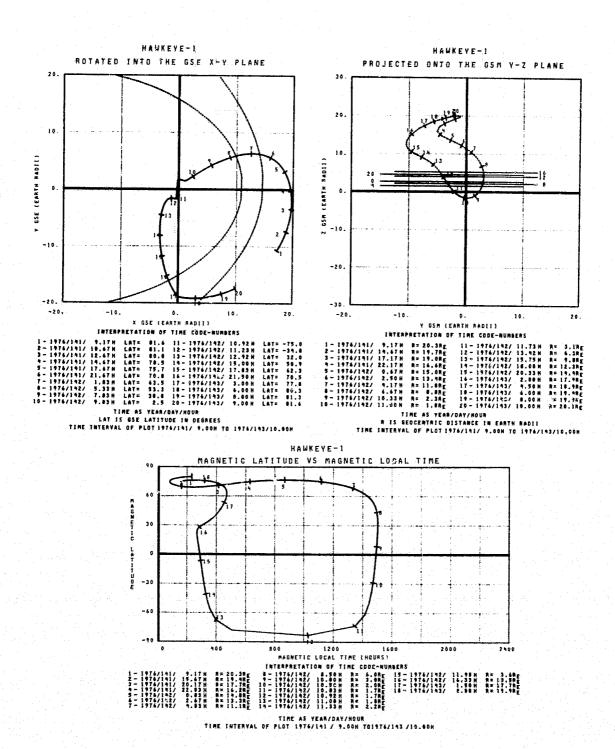


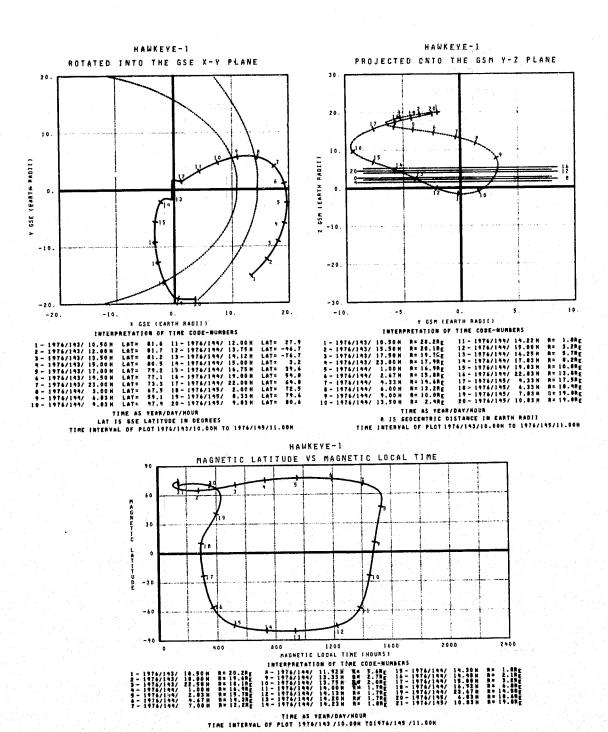


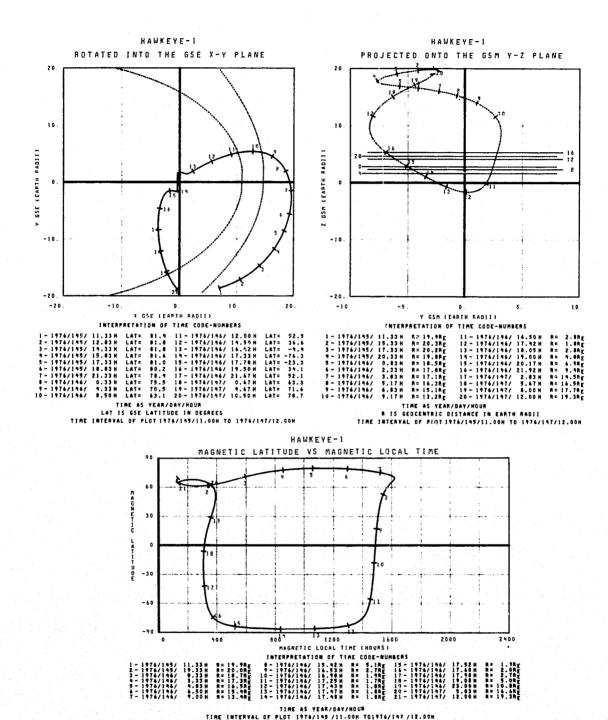


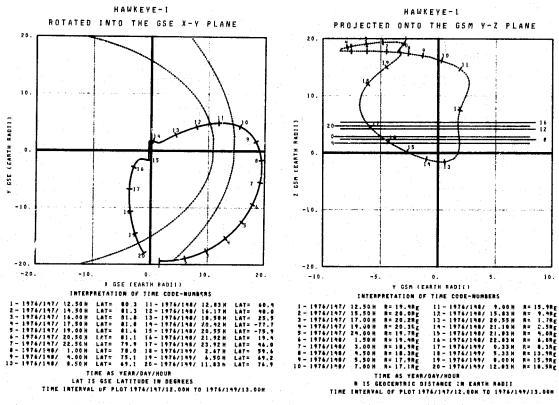


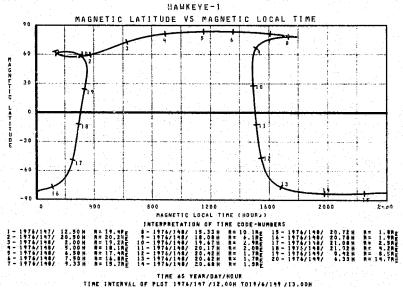


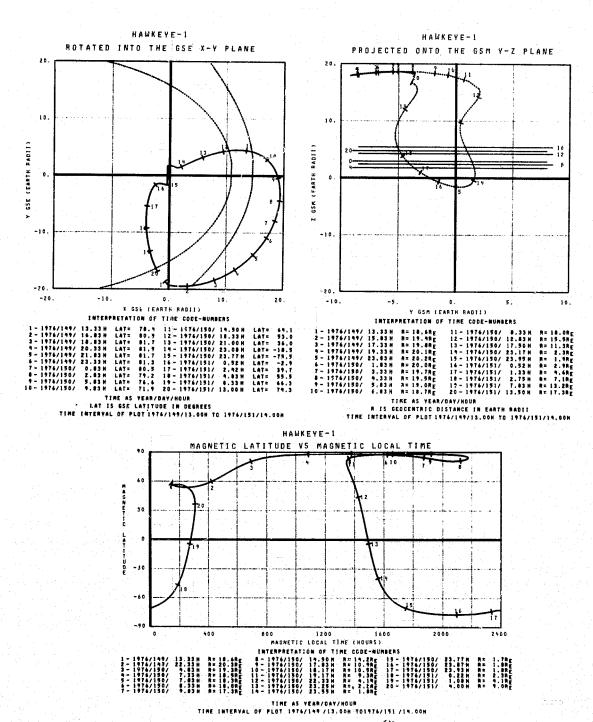


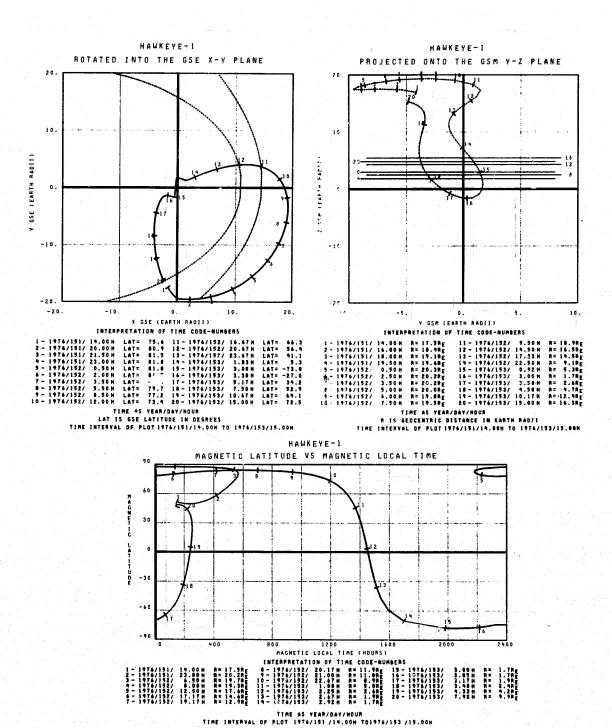


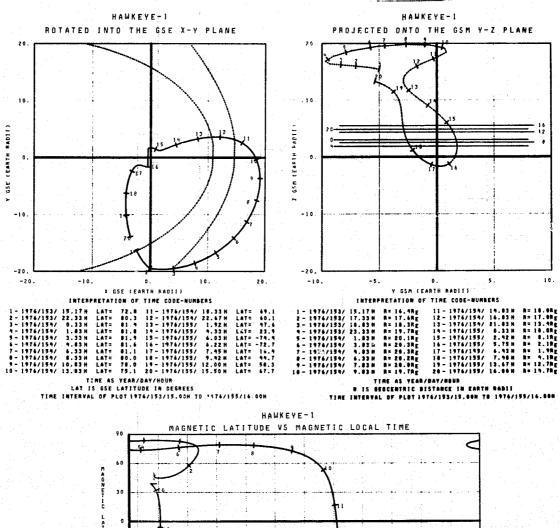


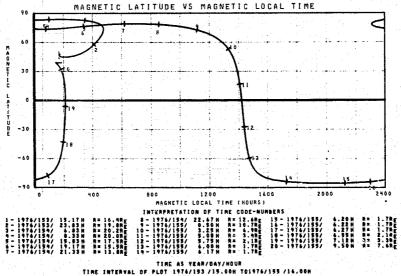


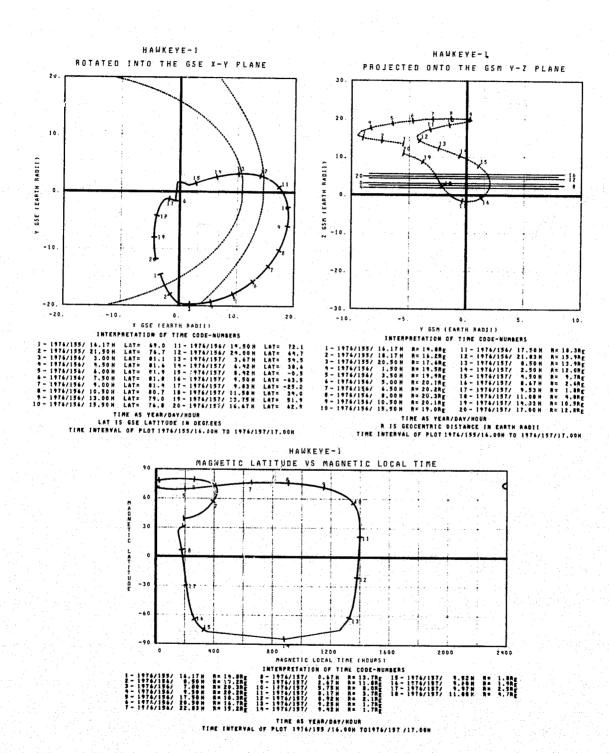


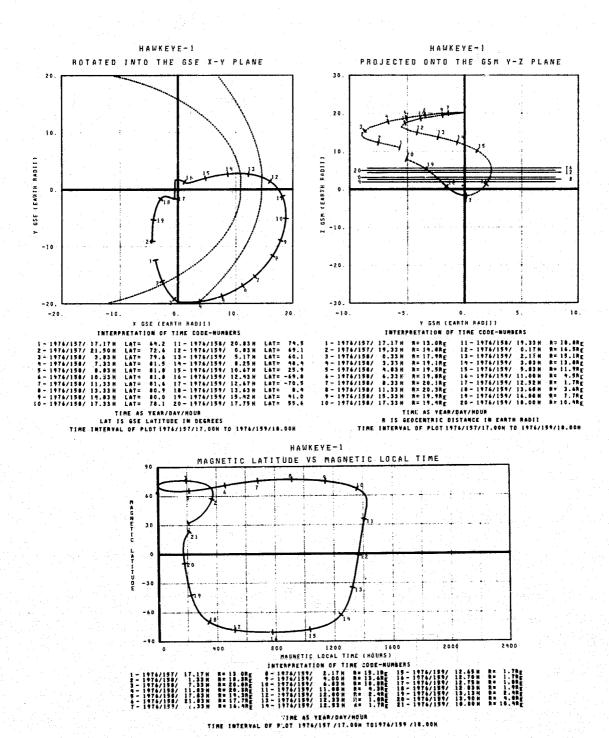


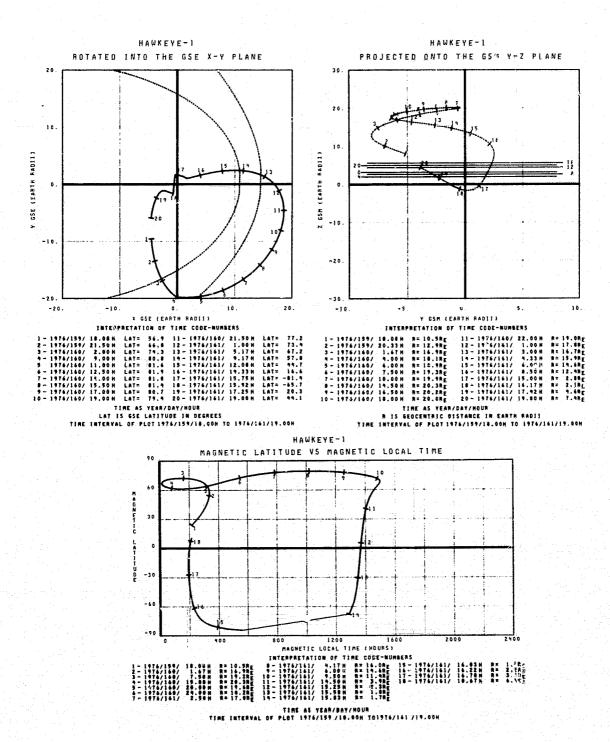


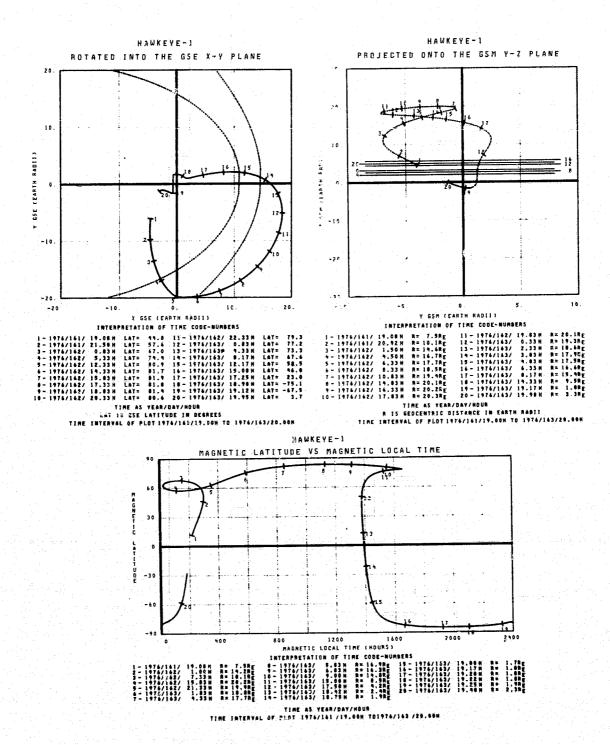


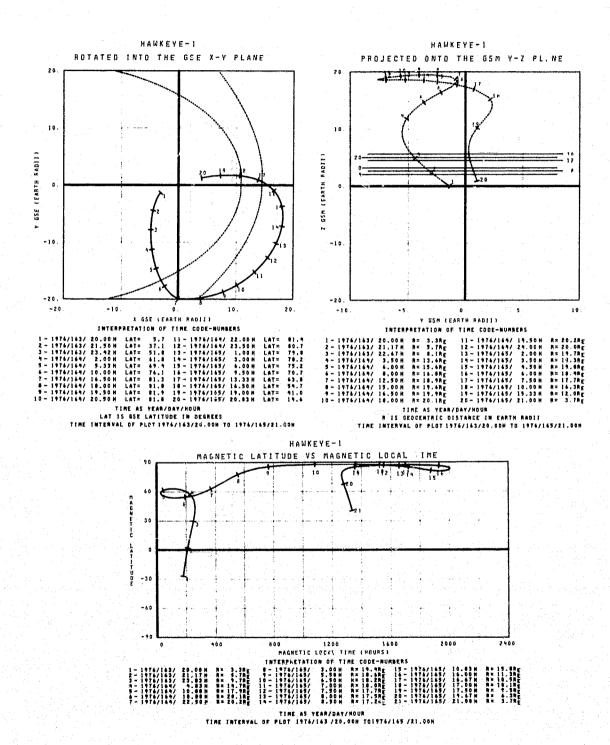


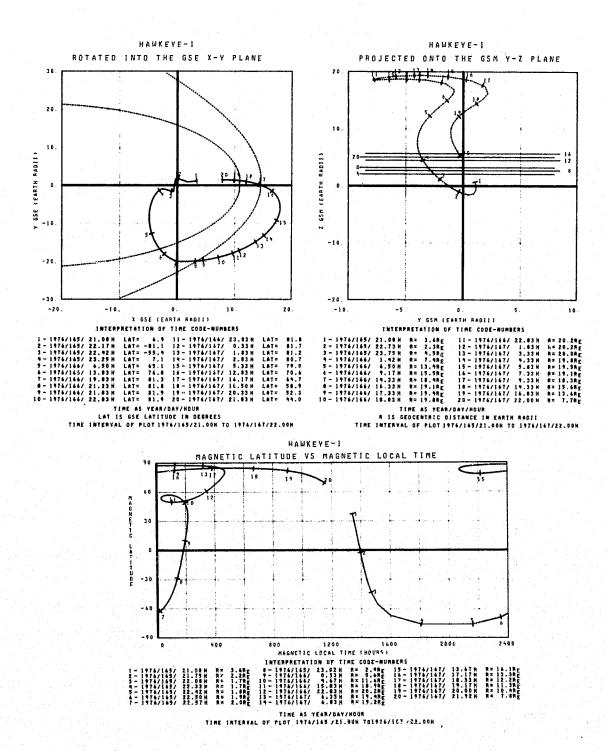


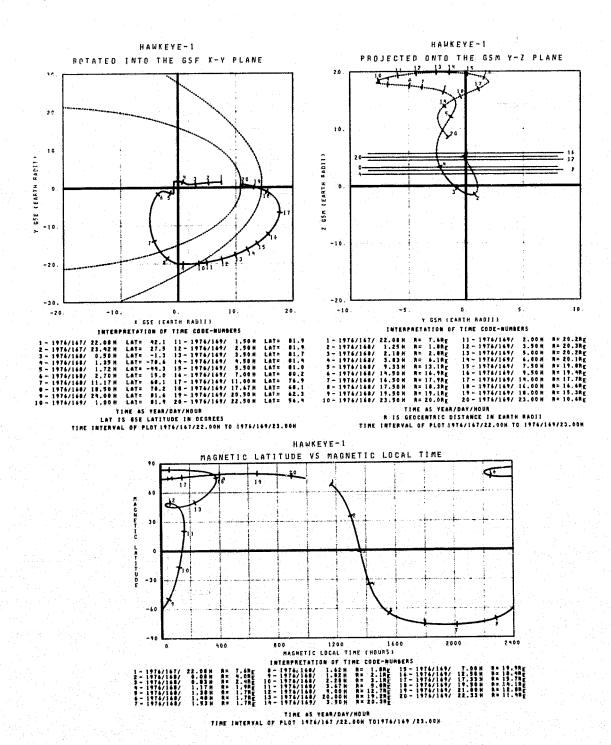


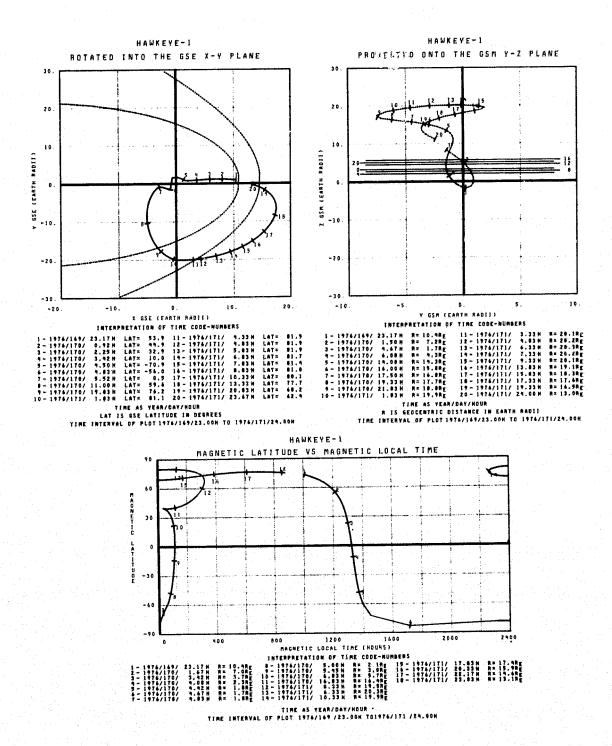


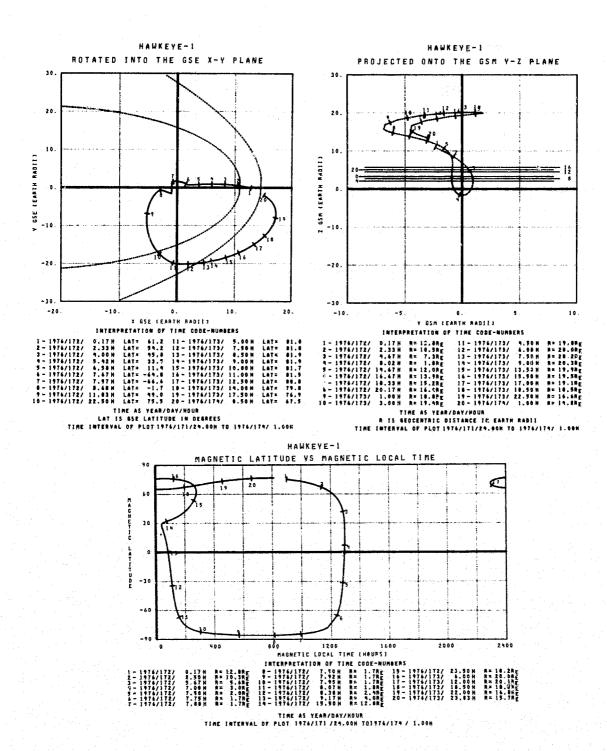


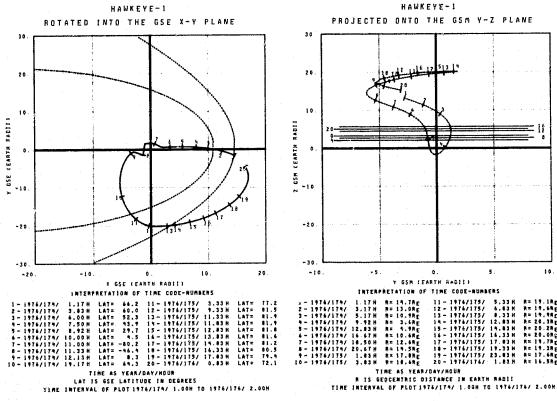


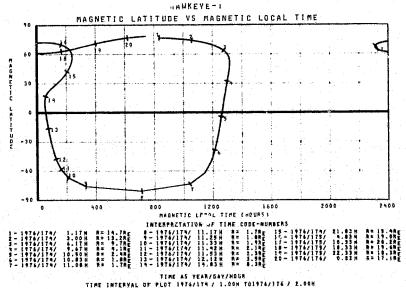


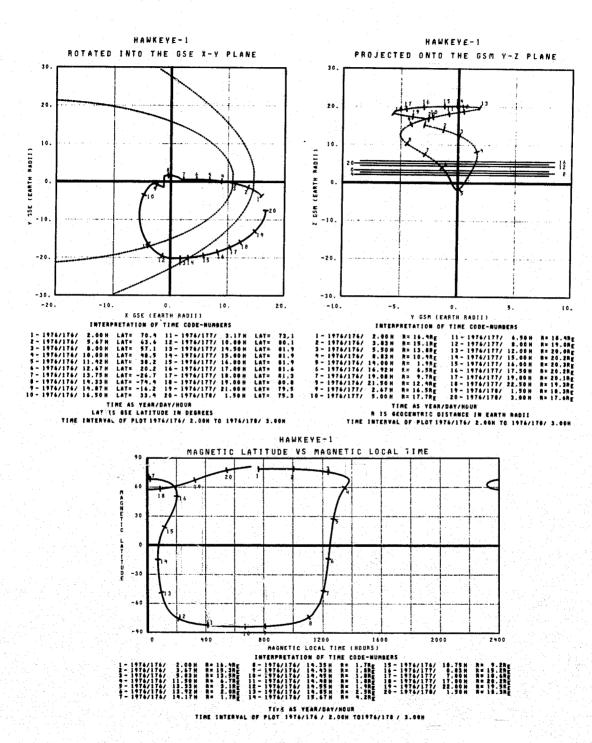


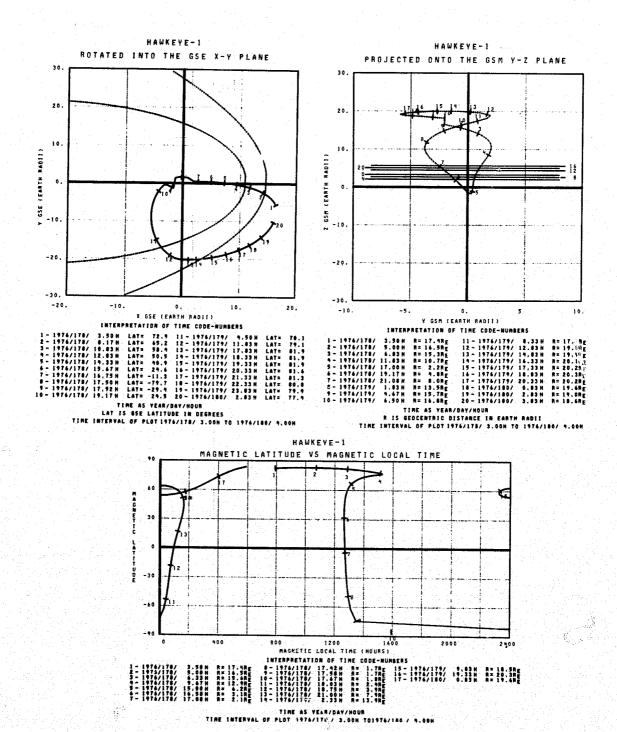


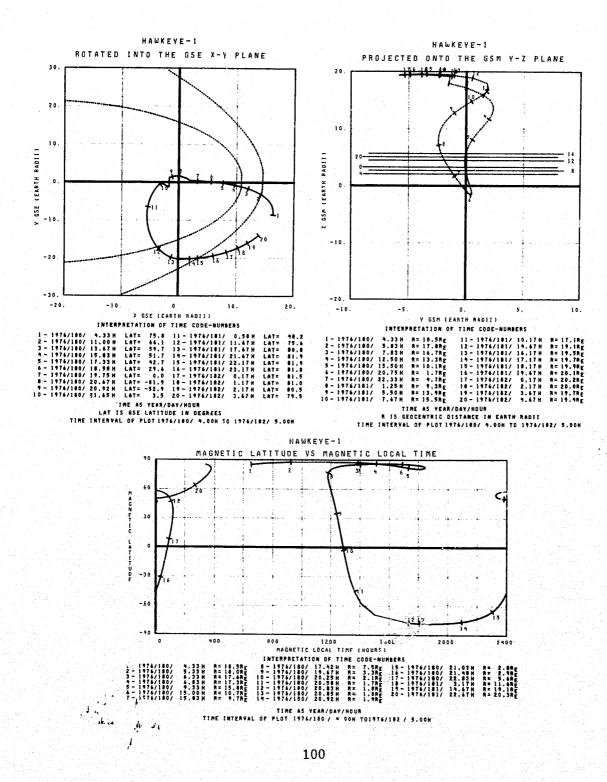


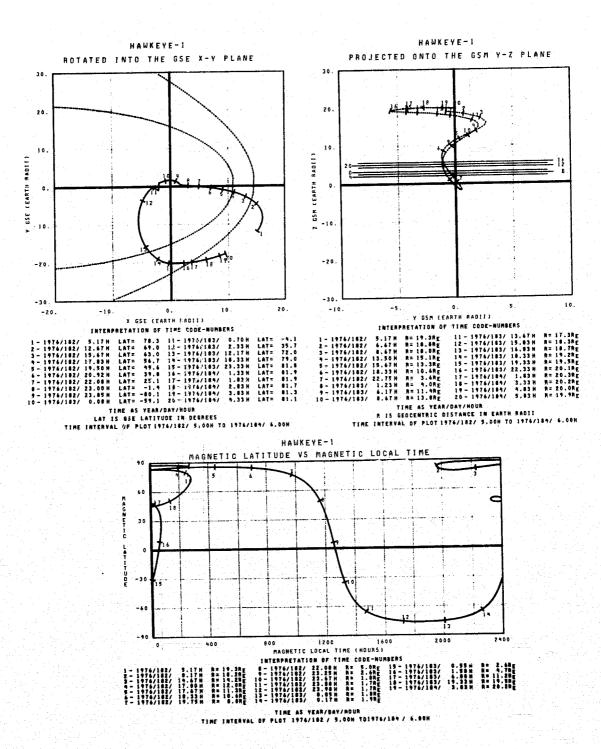


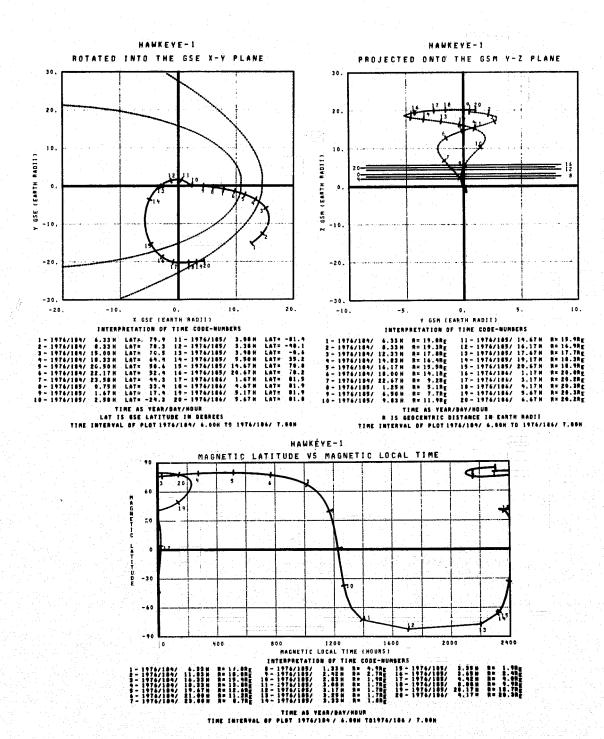


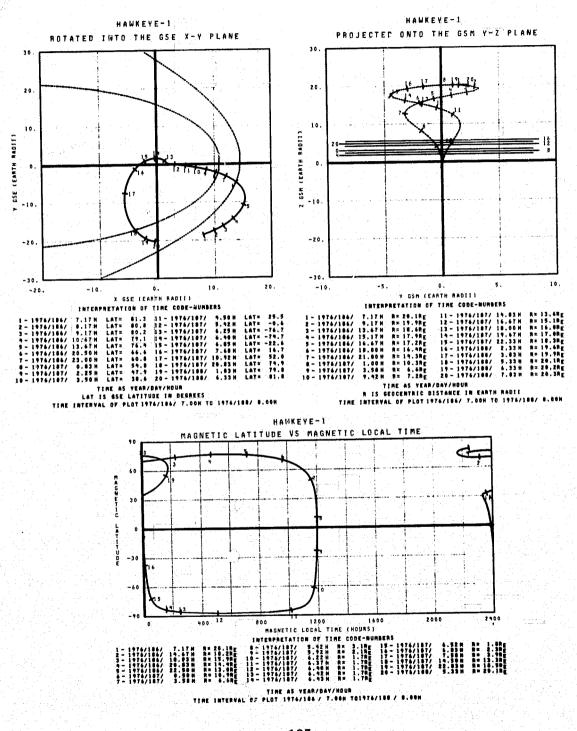


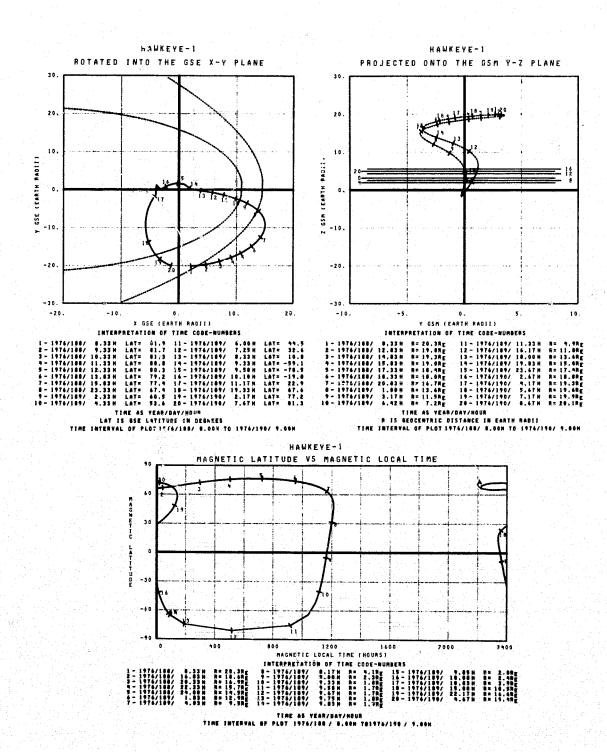


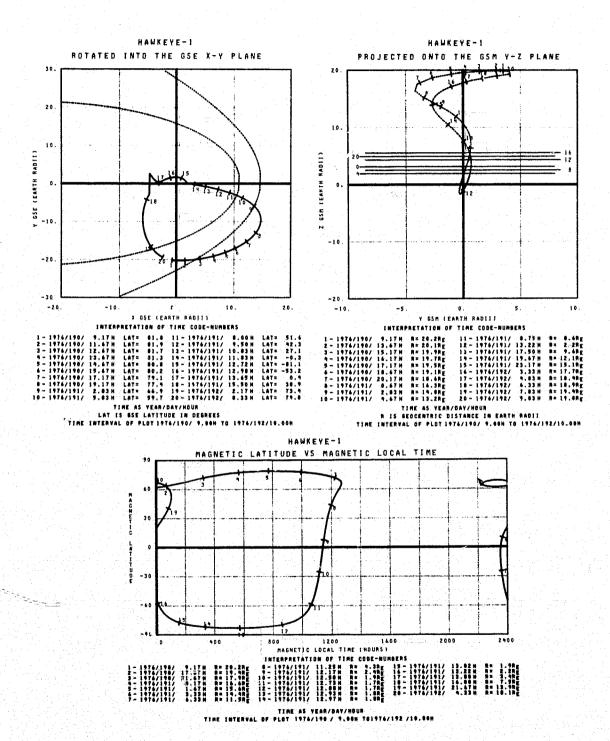


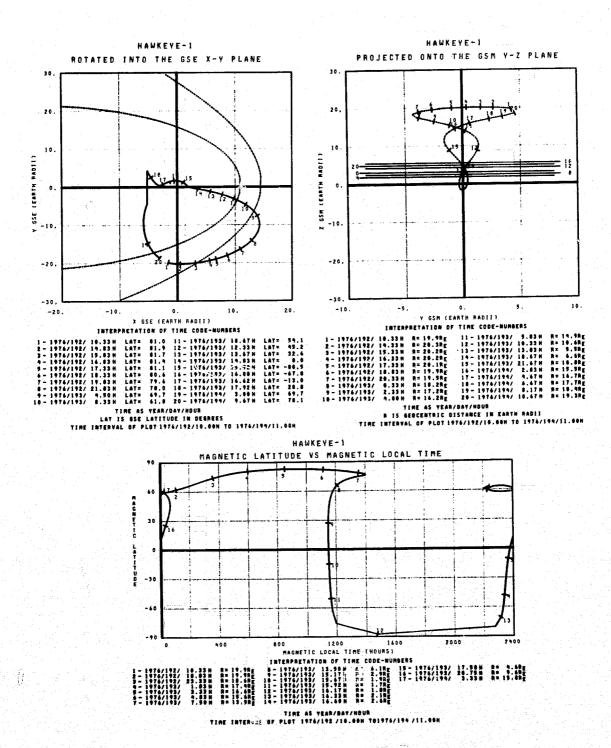


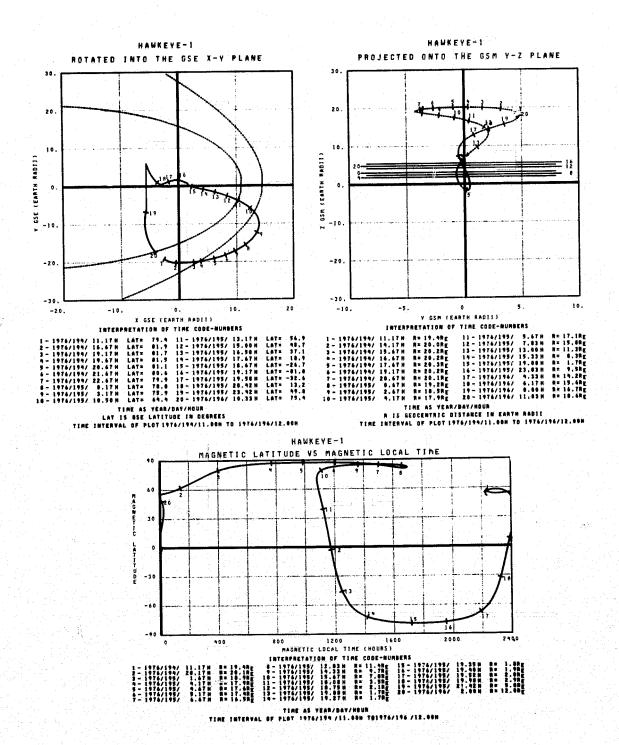


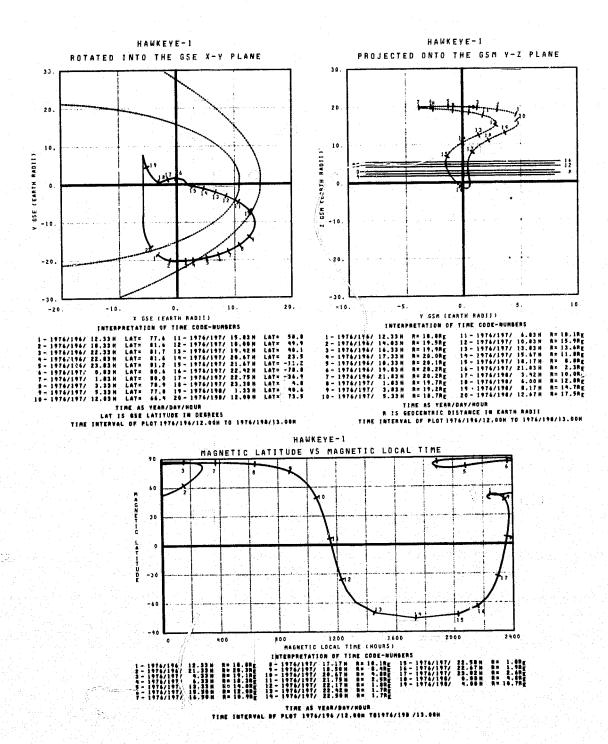


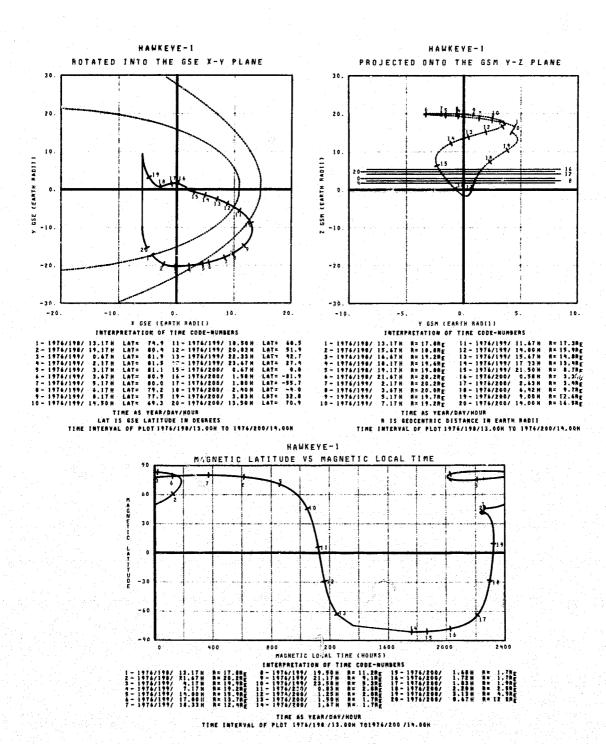




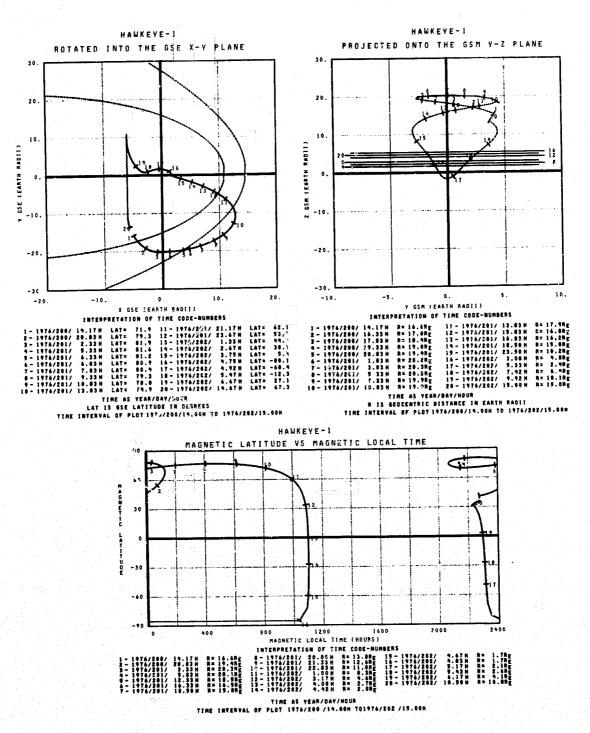




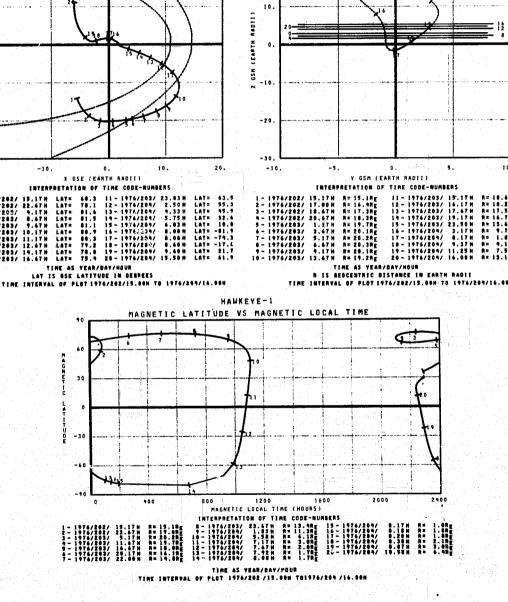












30.

20.

HAWKEYE-1

PROJECTED ONTO THE GSM Y-Z PLANE

HAWKEYE-1 ROTATED INTO THE GSE X-Y PLANE

20.

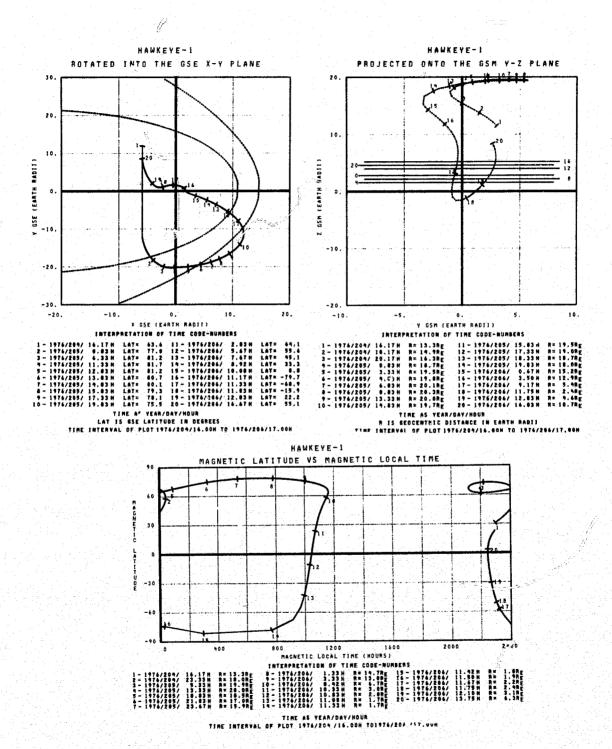
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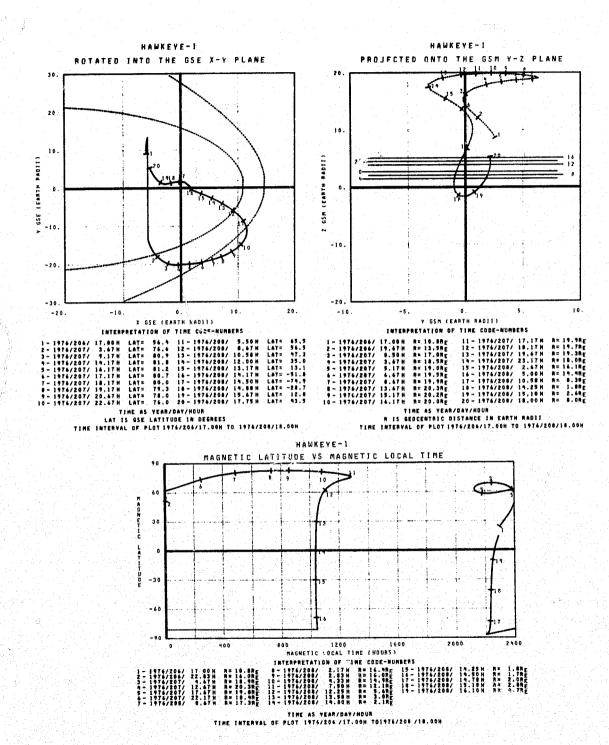
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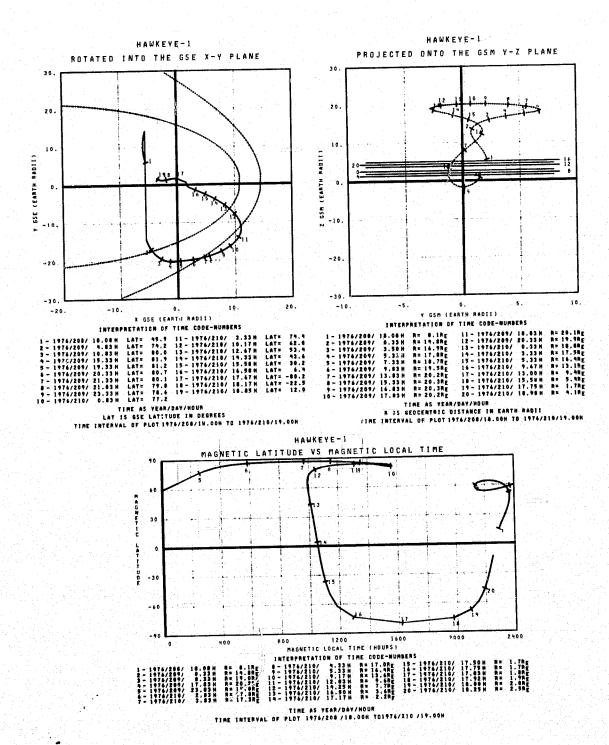
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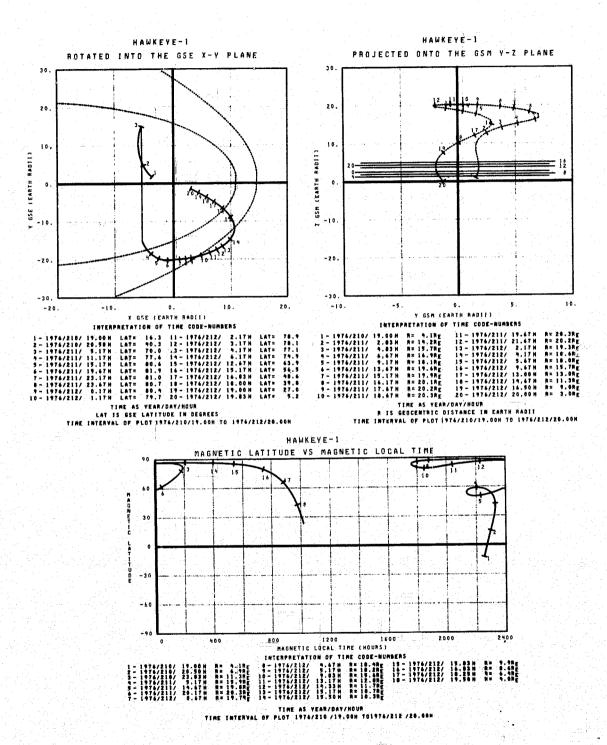
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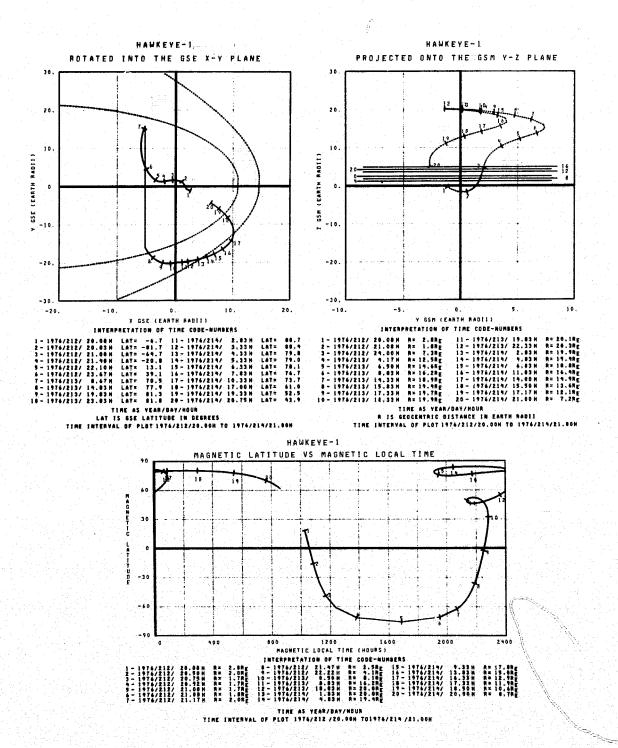
GSE LEARTH RADITS

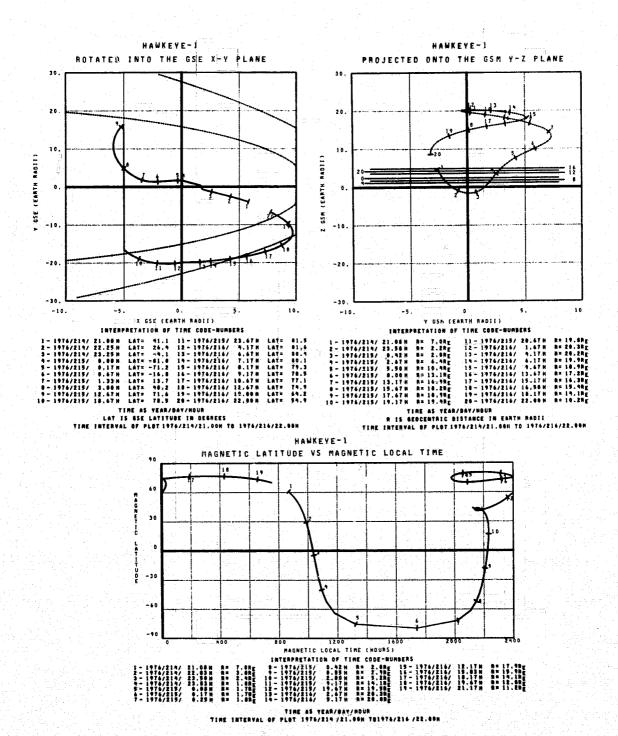


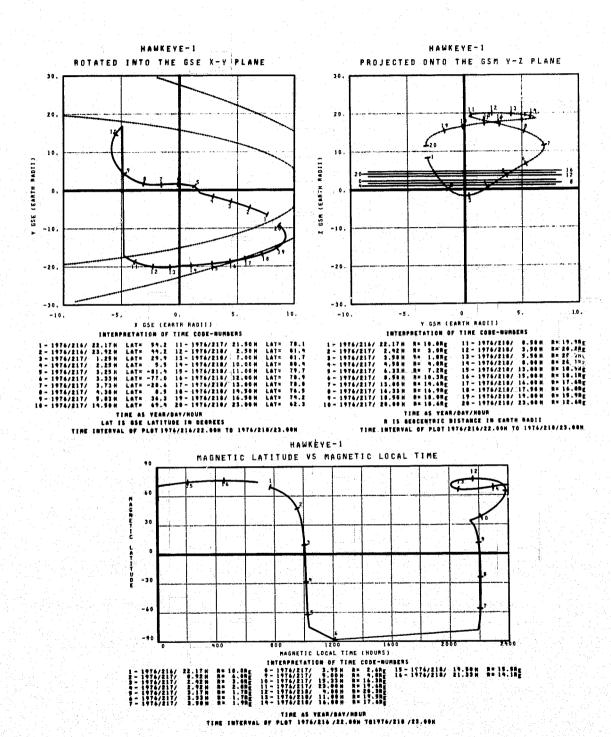


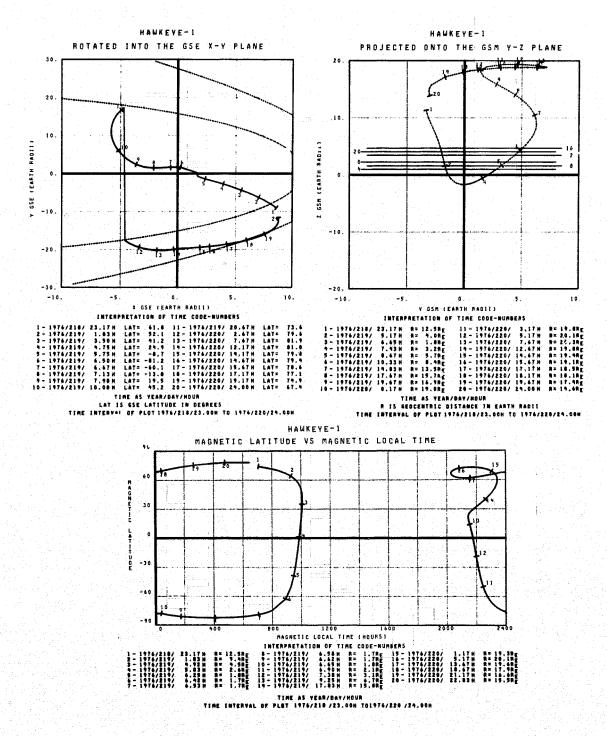




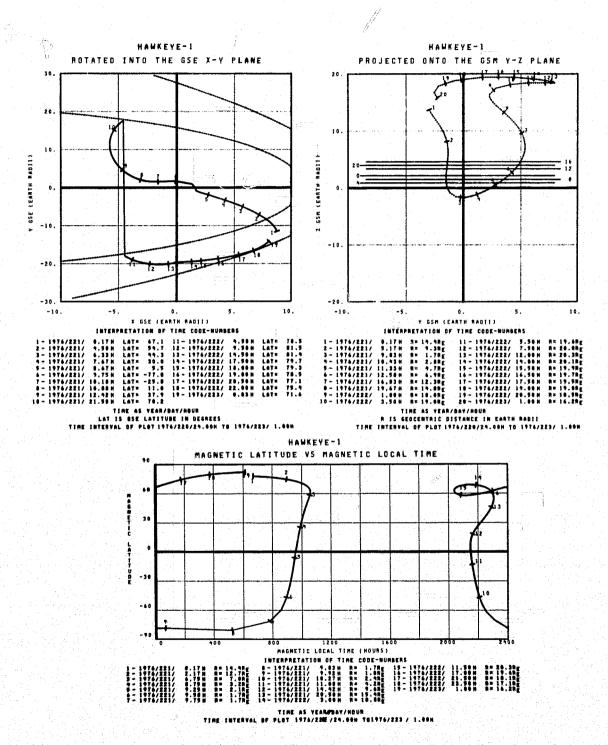


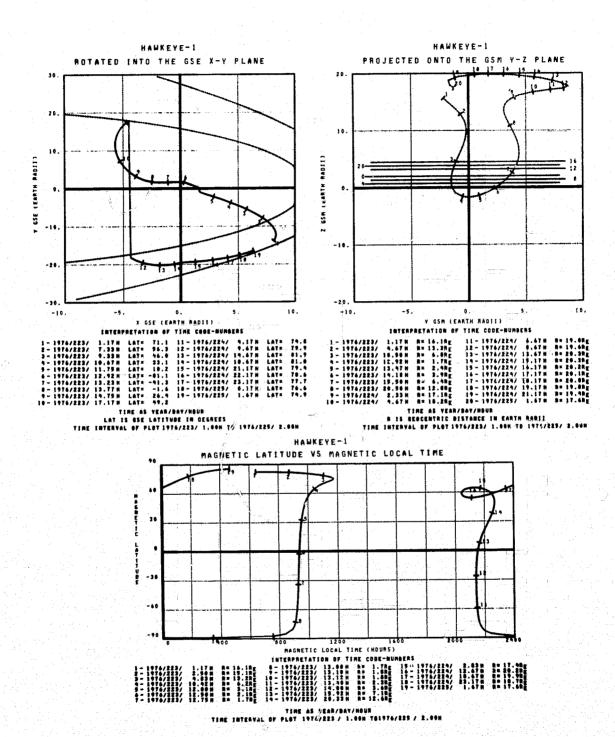


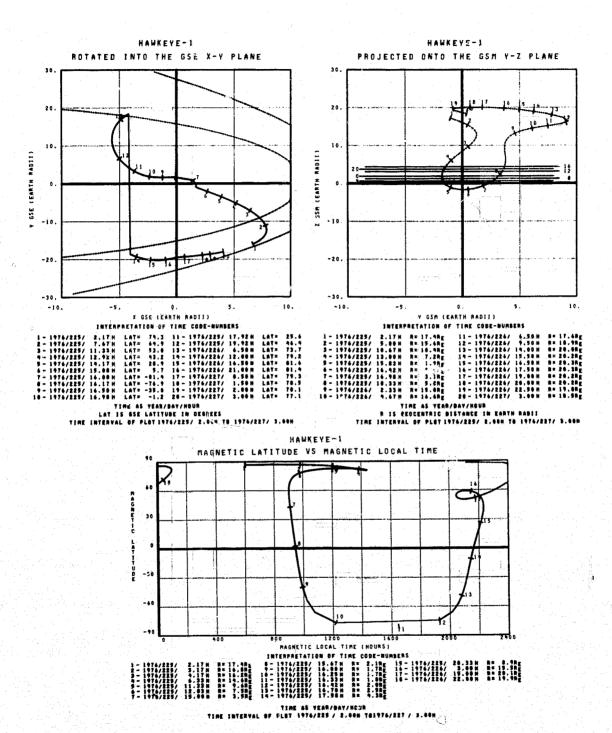


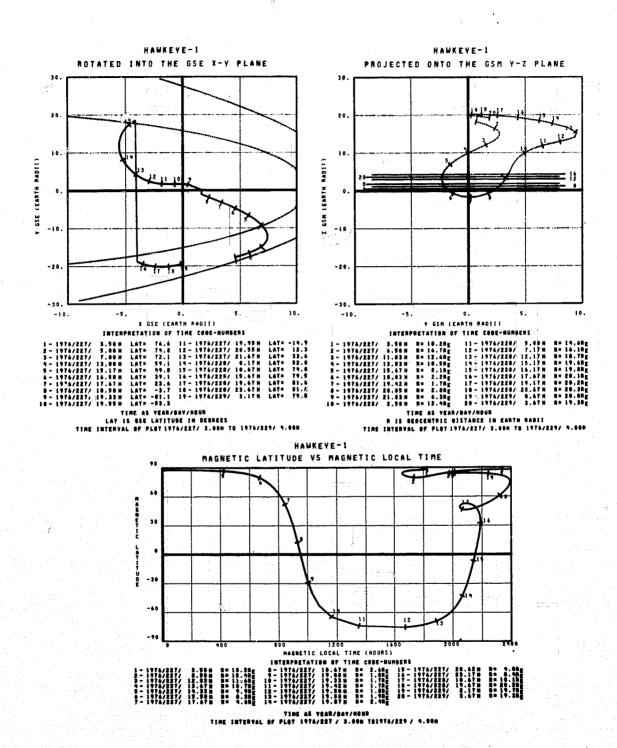


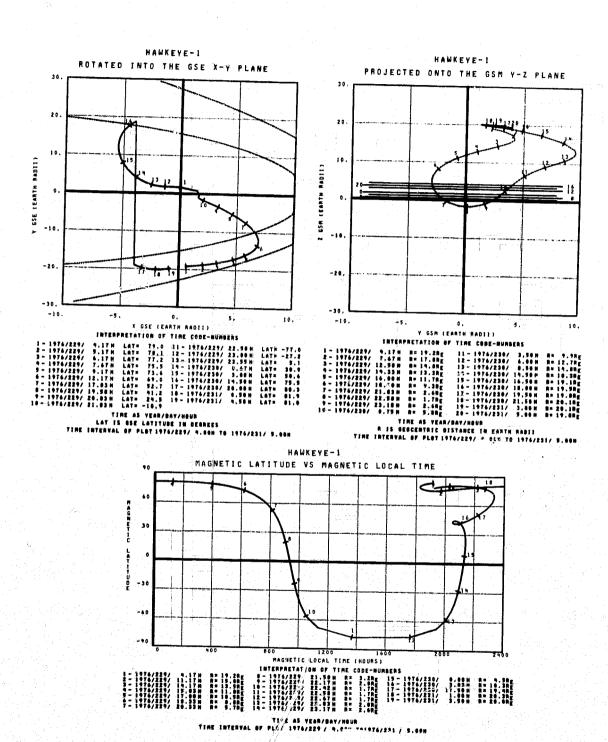
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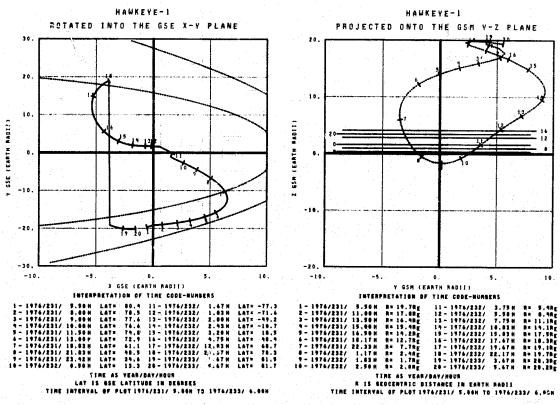


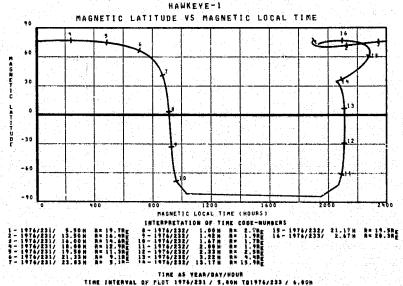


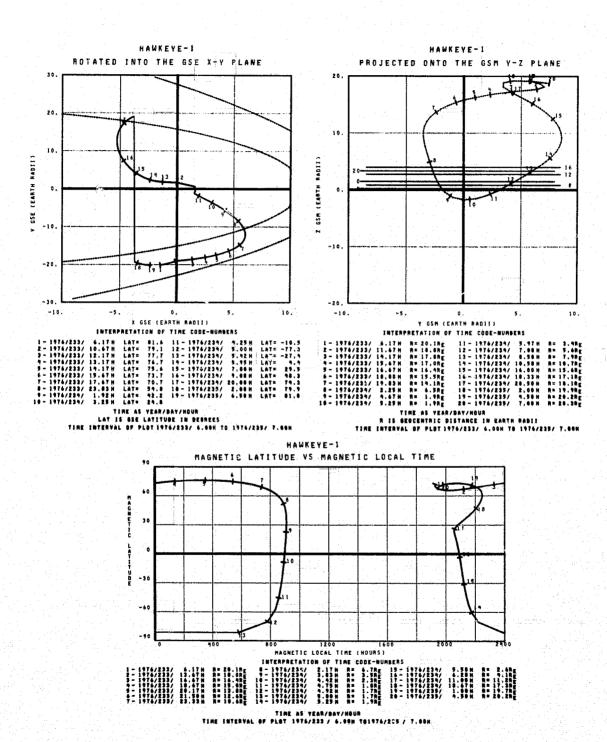


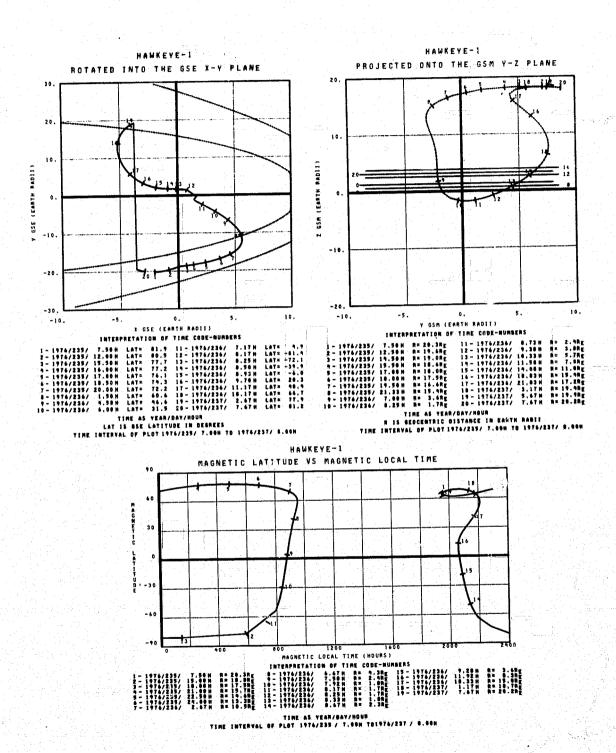


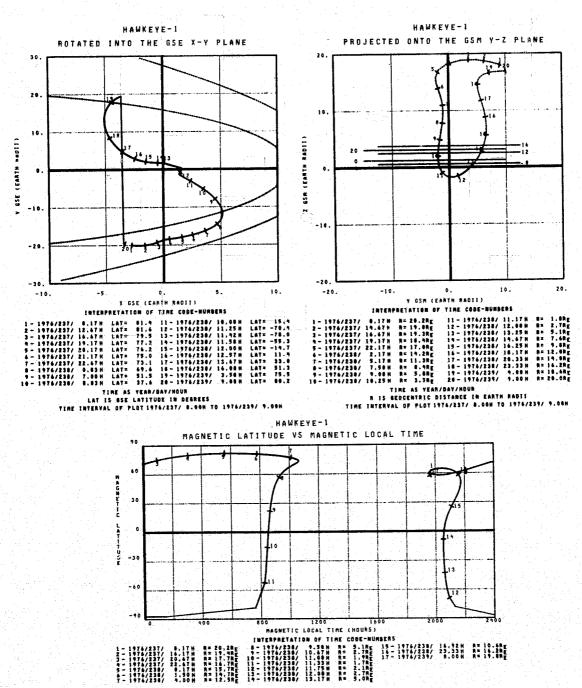




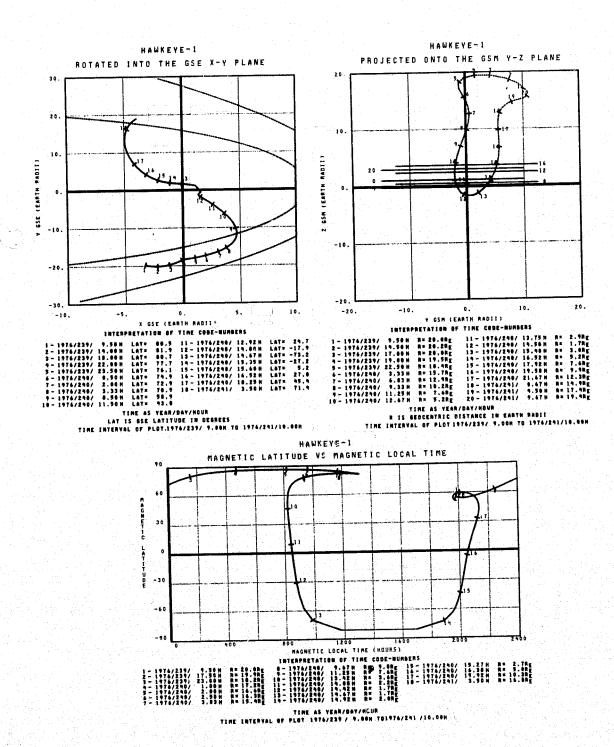


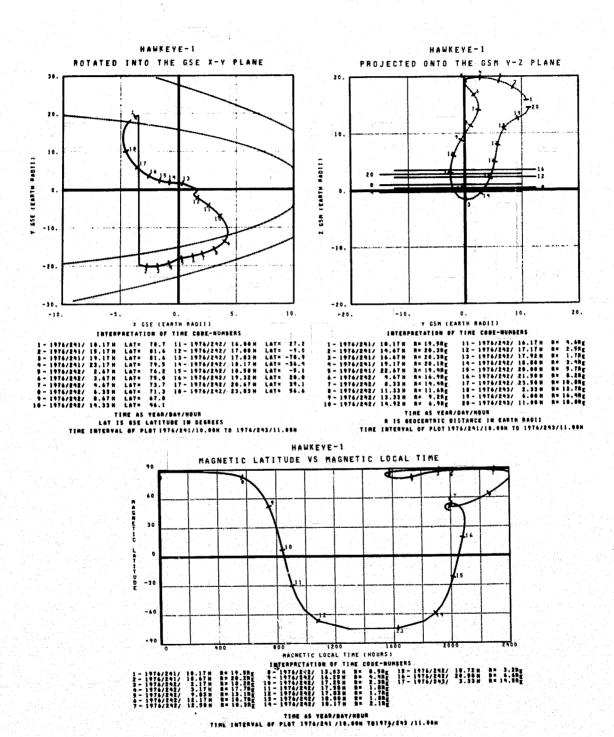




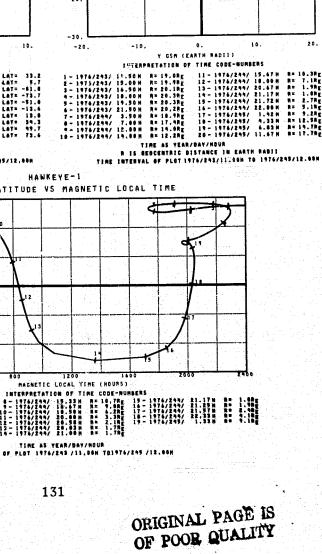


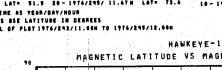
TIME AS YEAR/DAY/HOUR TIME INTERVAL OF PLOT 1976/237 / 8.00H TO1976/237 / 9.00H



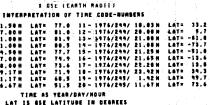








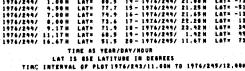






HAWKEYE-1

PROJECTED ONTO THE GSM Y-Z PLANE



HAWKEYE-1

ROTATED INTO THE GSE X-Y PLANE

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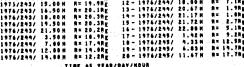
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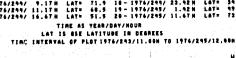
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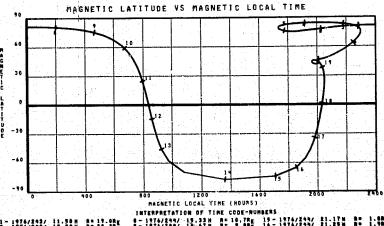
GSE (EANTH RADII)











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10

-20.

-30.

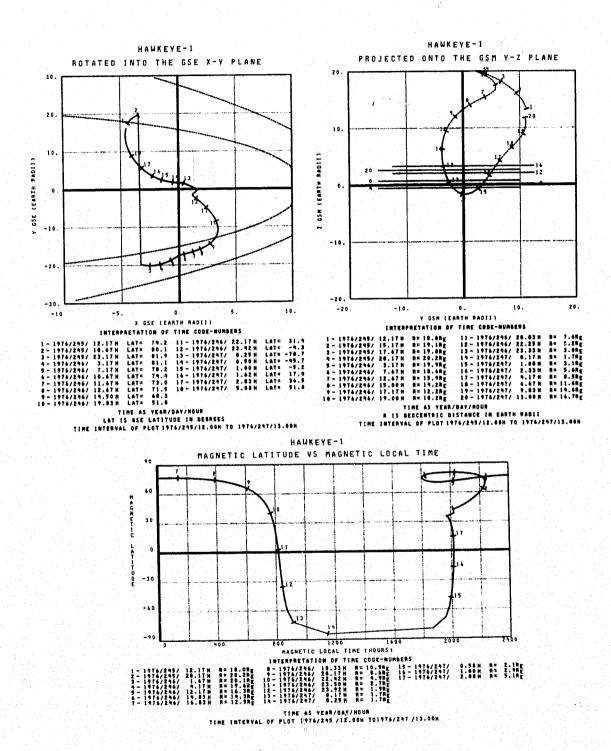
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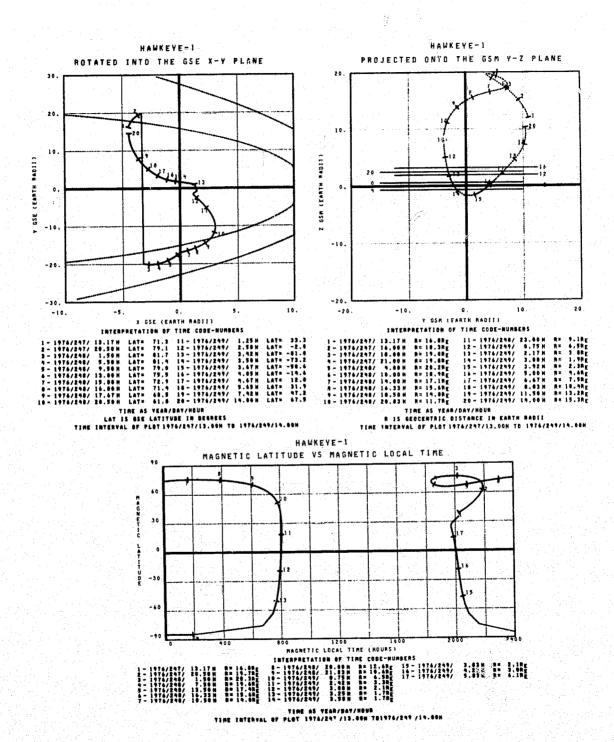
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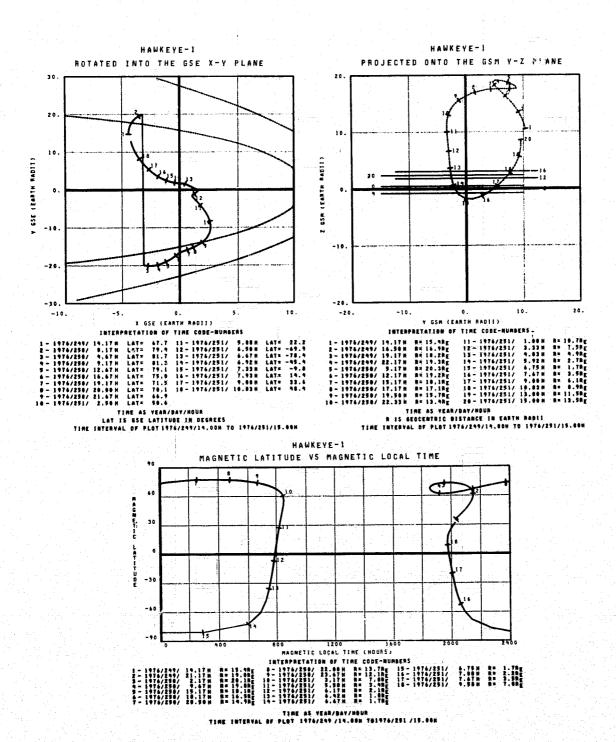
2 GSM LEARTH RADILL

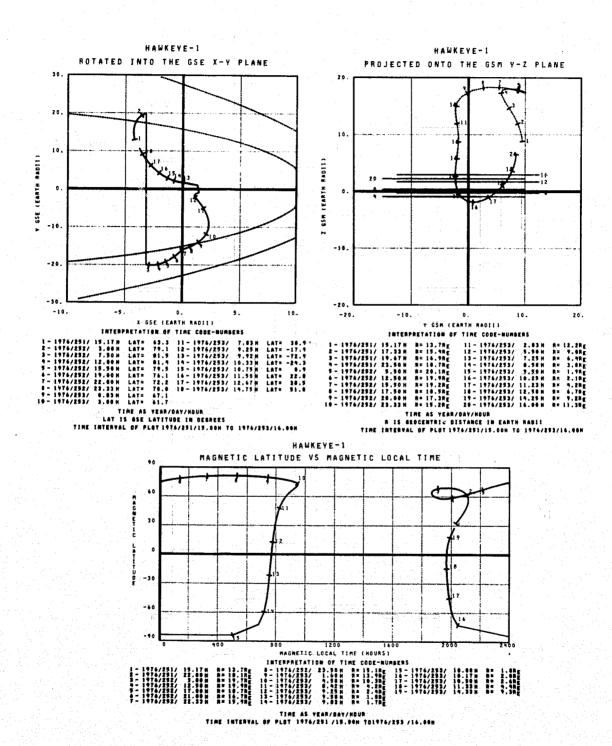


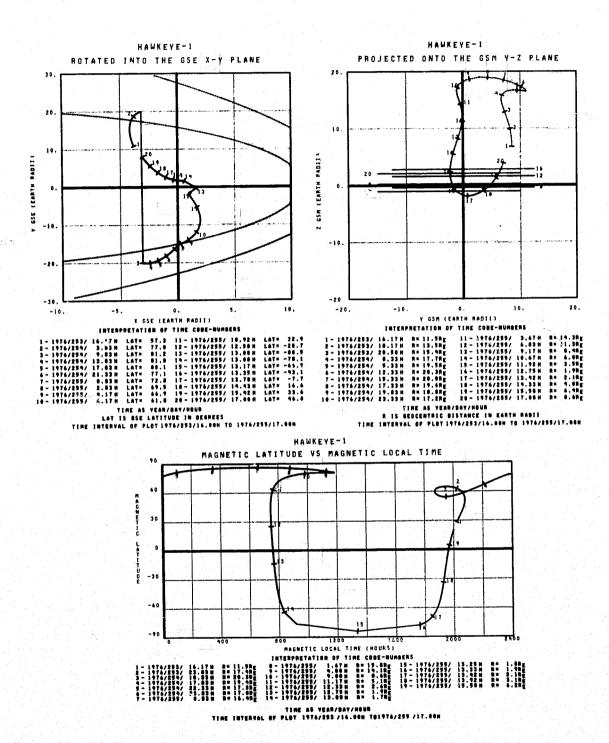
TIME AS YEAR/DAY/NOUR TIME INTERVAL OF PLOT 1976/243 /11,86H T01976/245 /12.86H

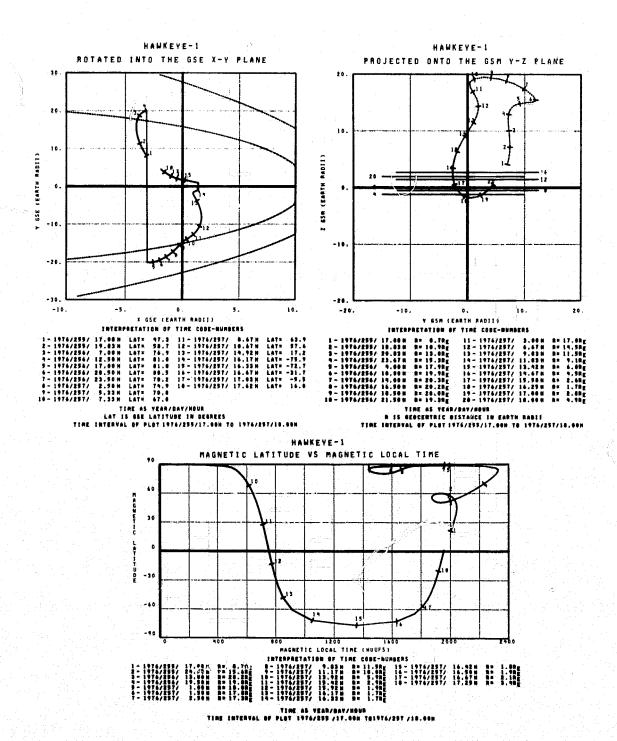


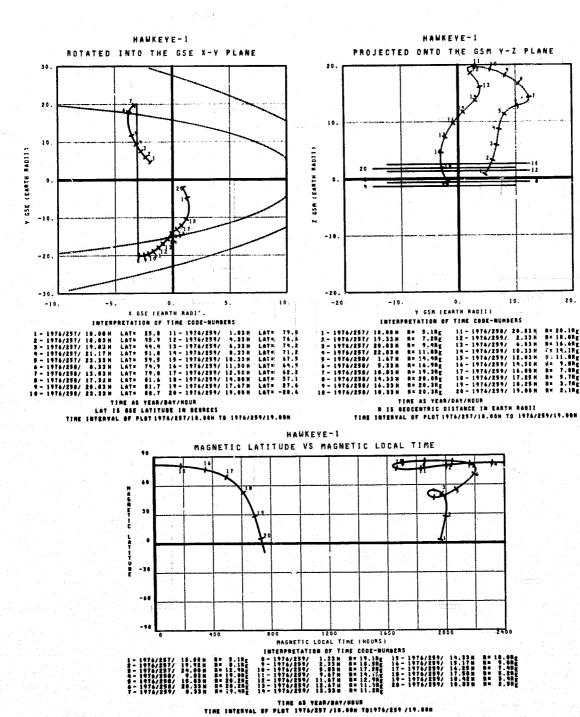


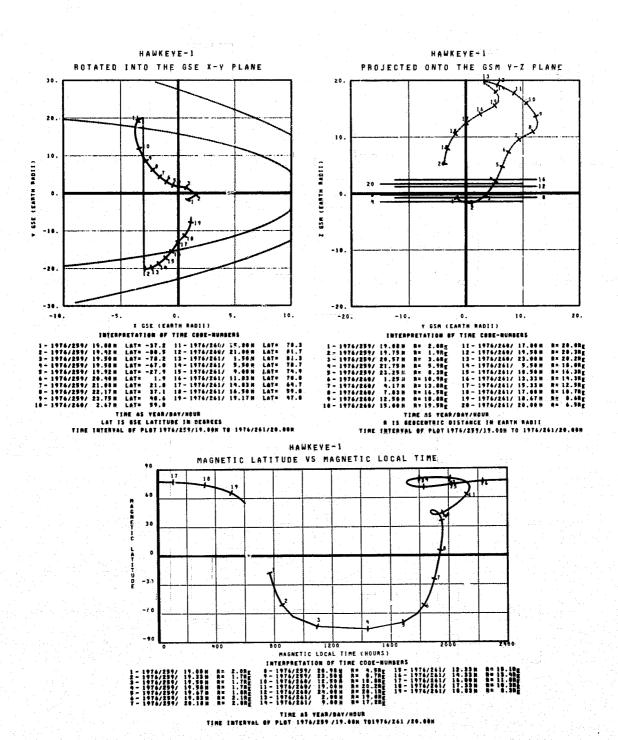


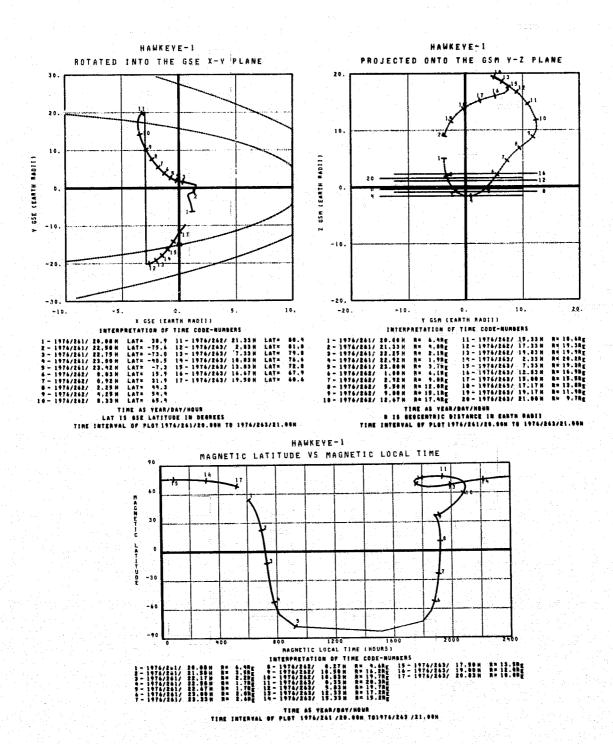


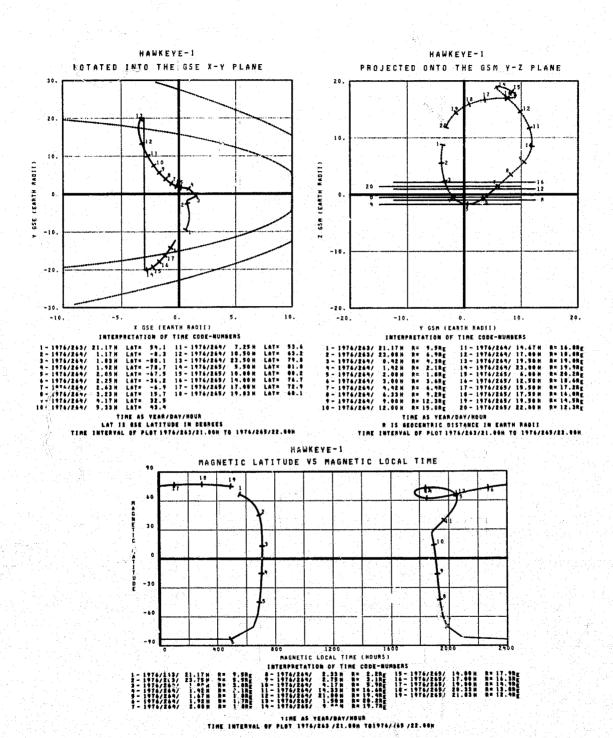


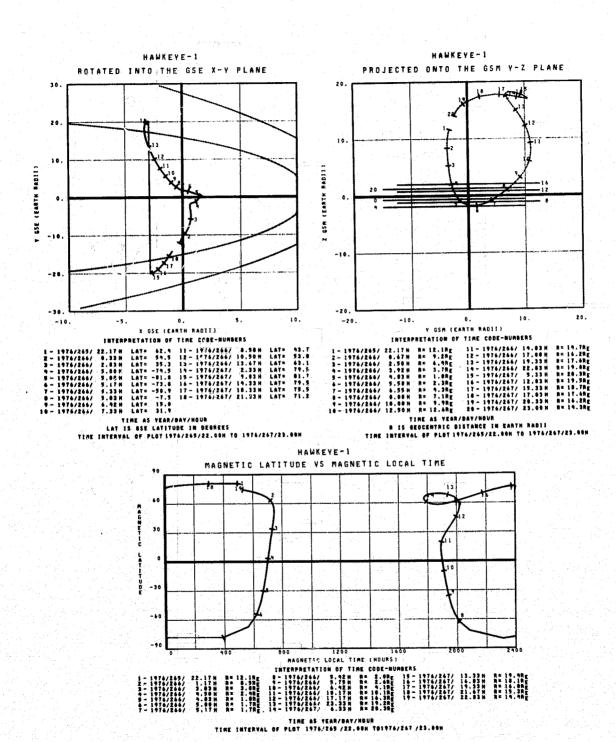


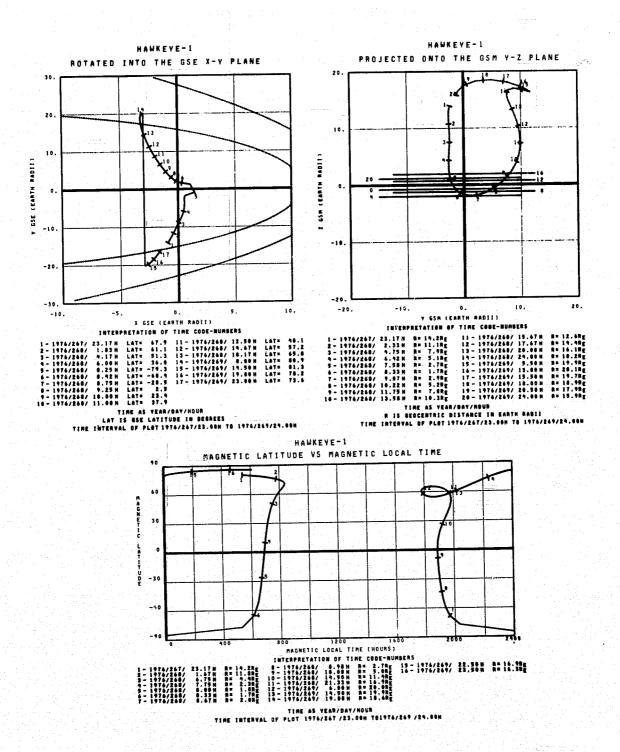


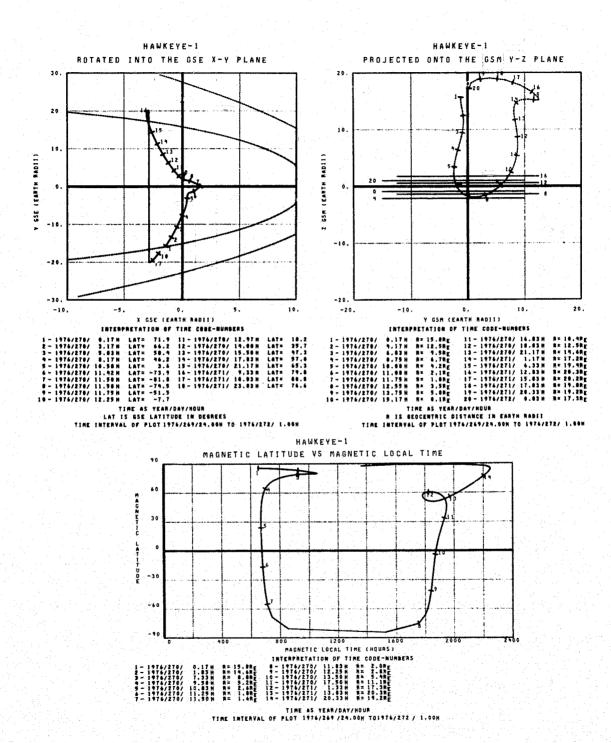


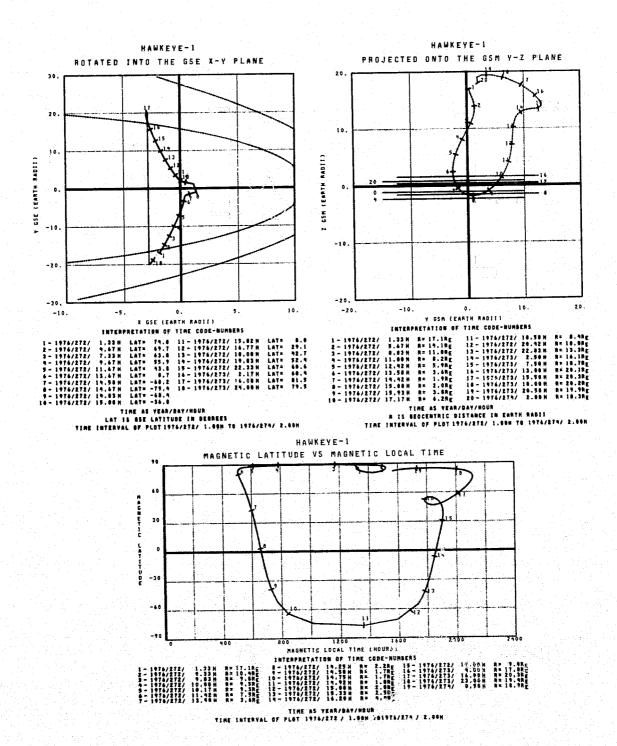


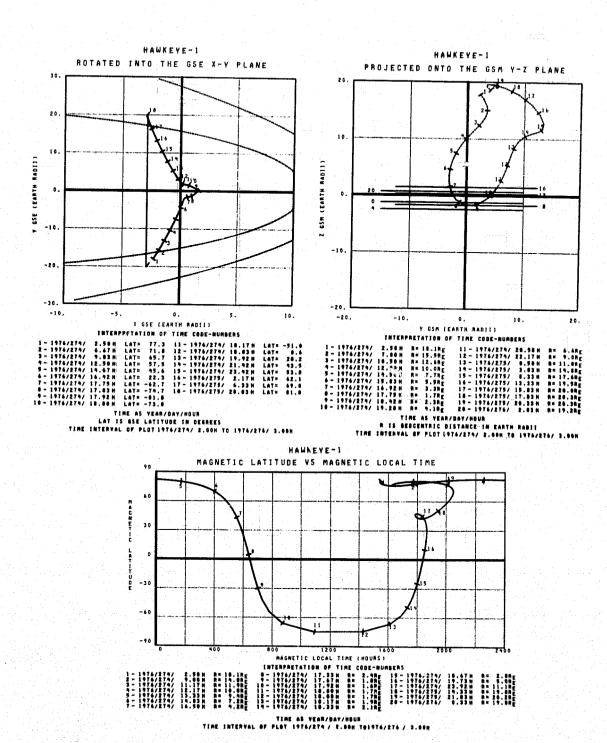


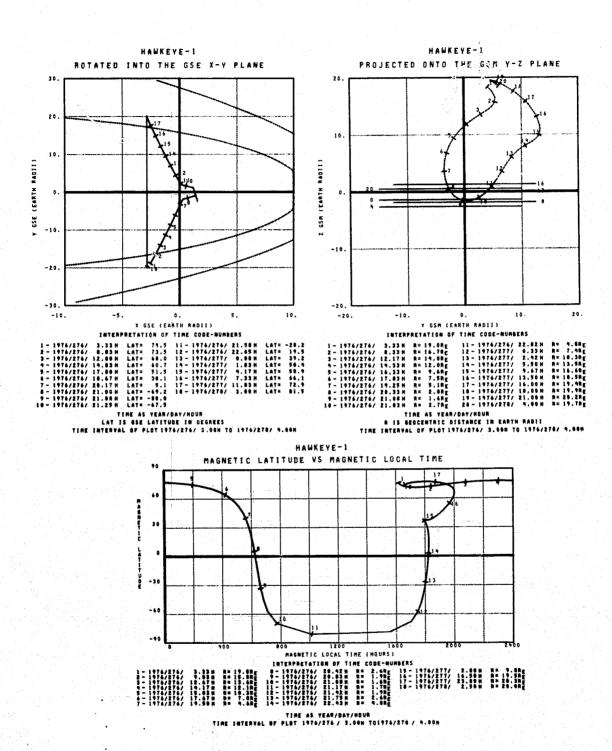


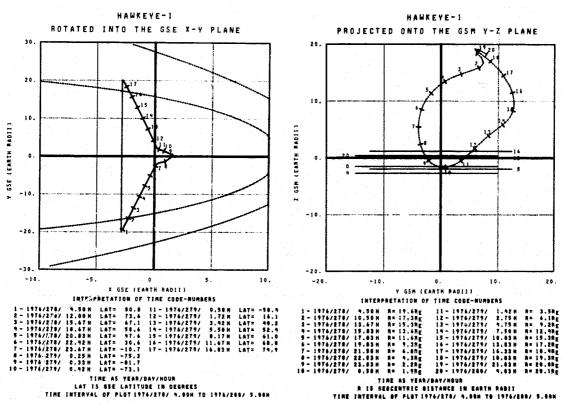


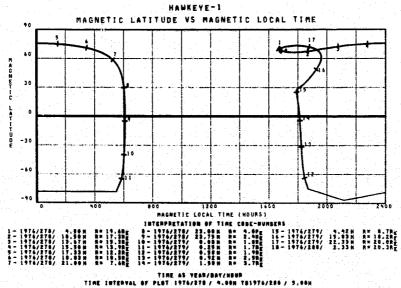


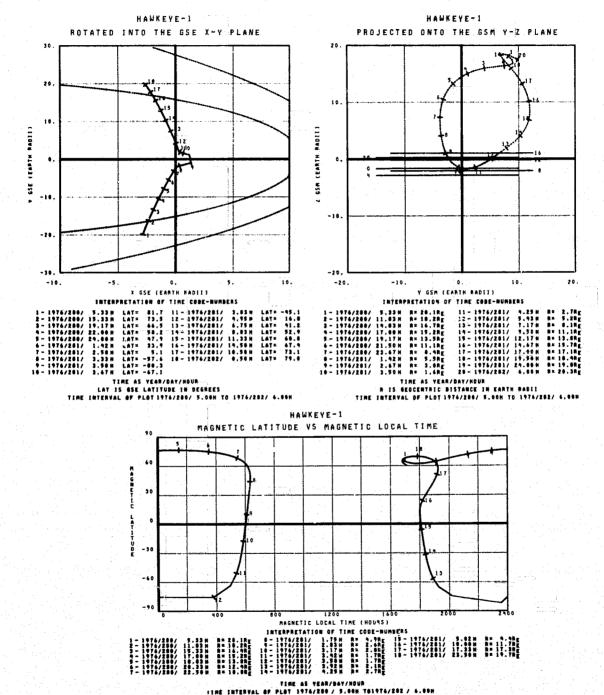


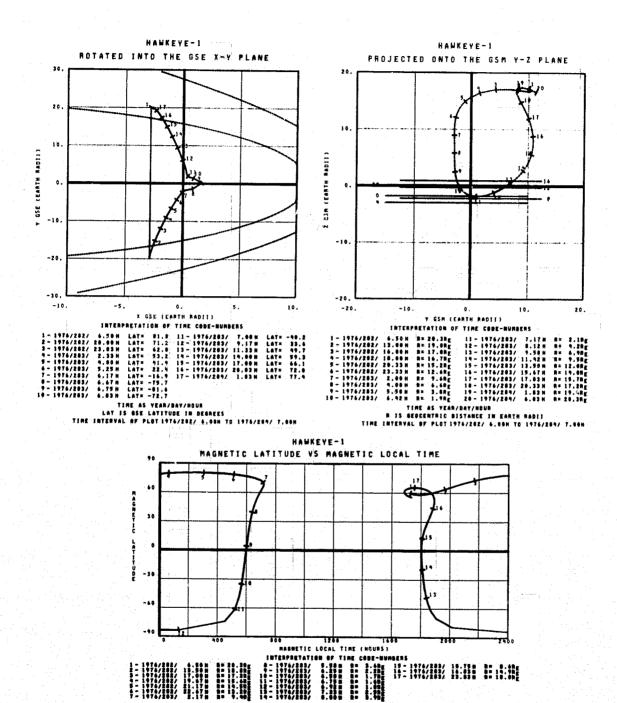






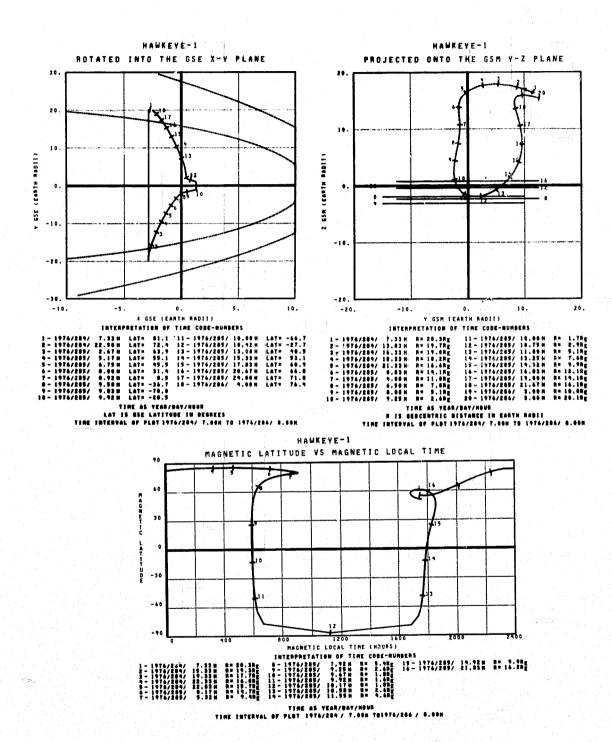


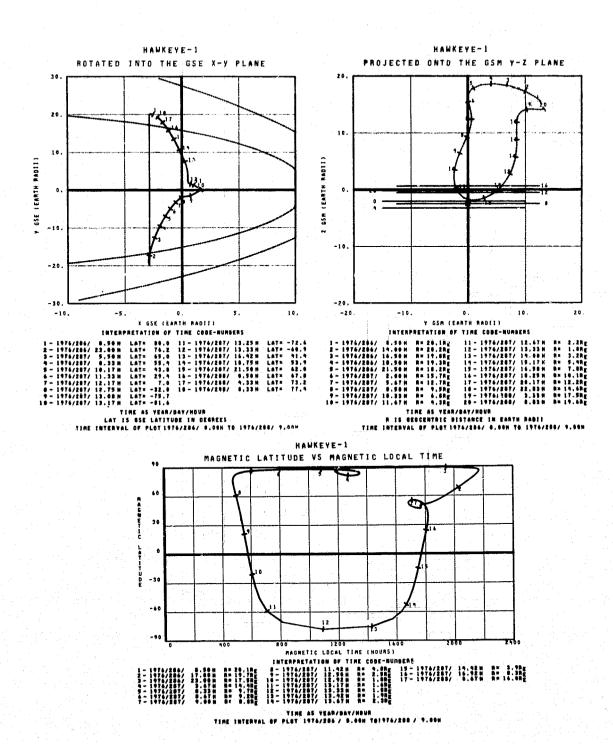


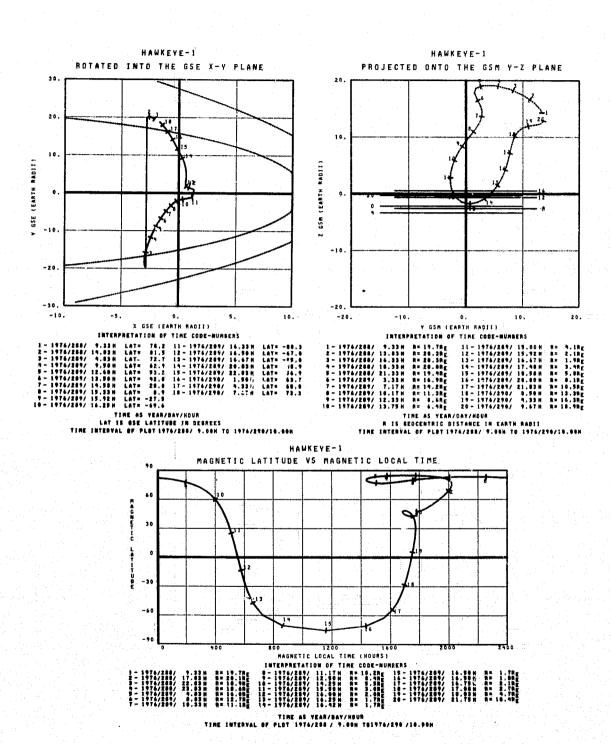


150

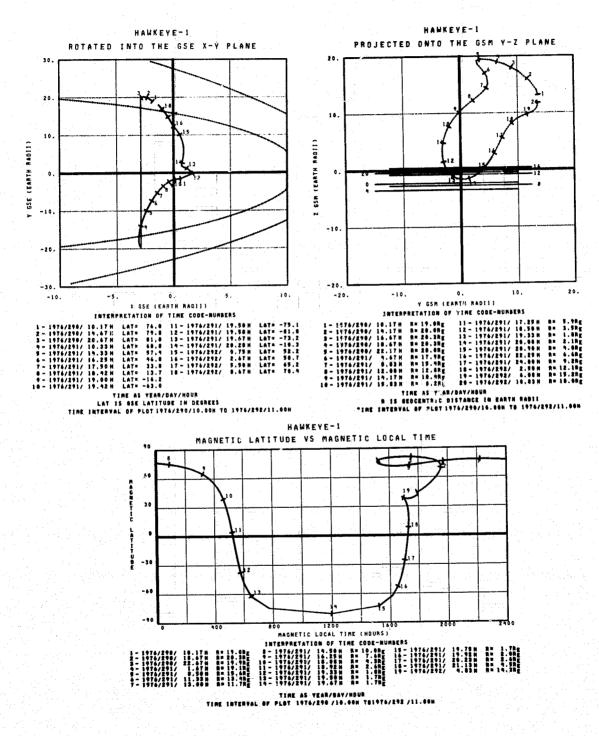
TIME AS VEAS/BAY/SOUN TIME INTERVAL OF PLOT 1976/282 / 6.00m vol976/284 / 7.00m

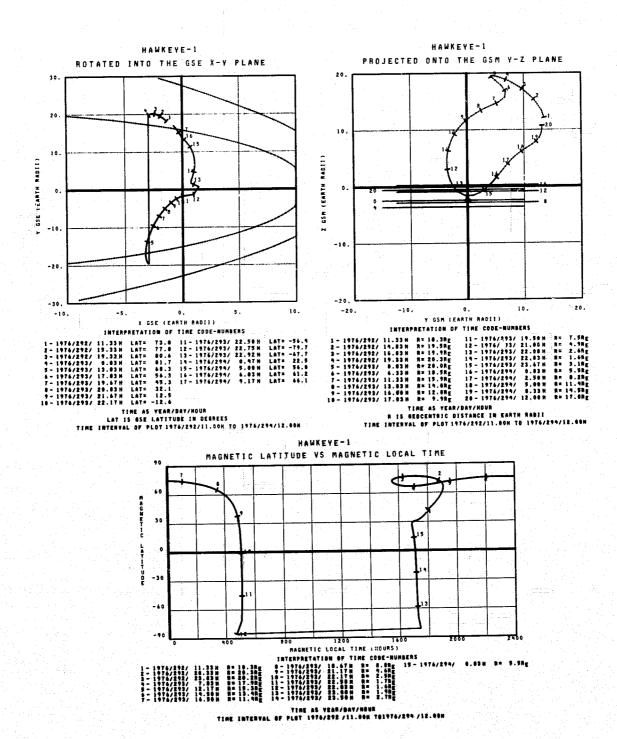


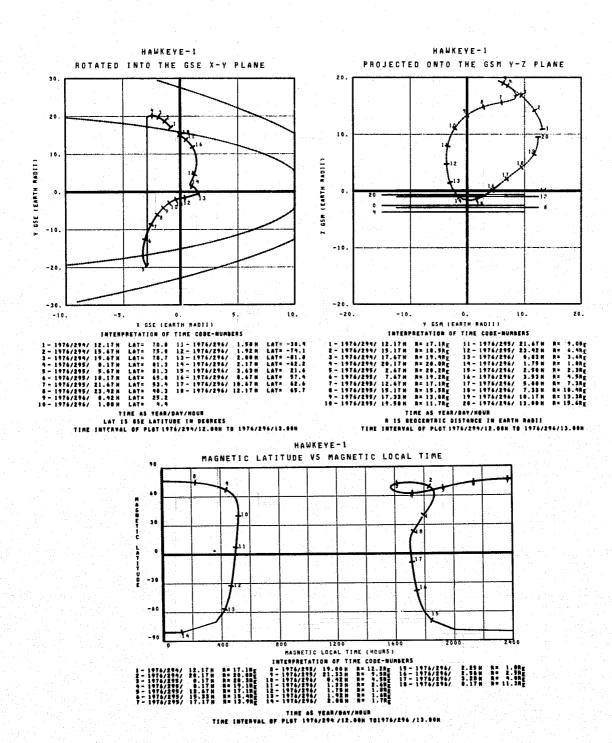


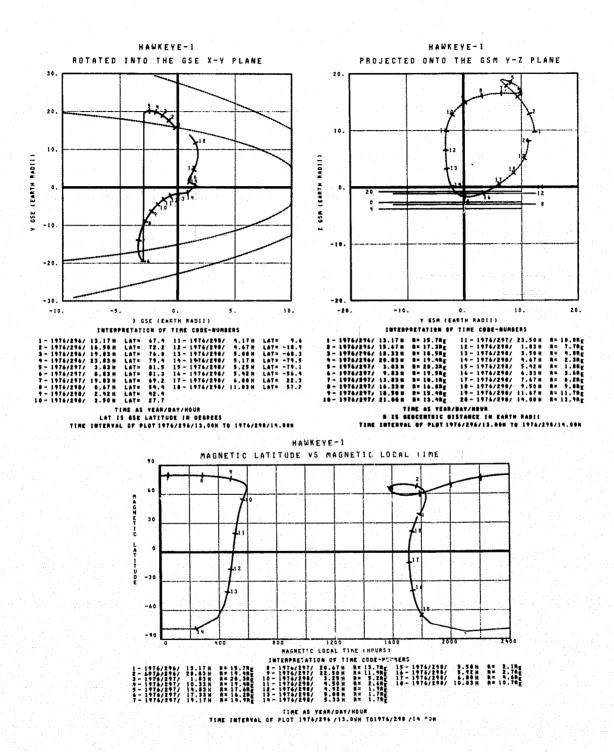


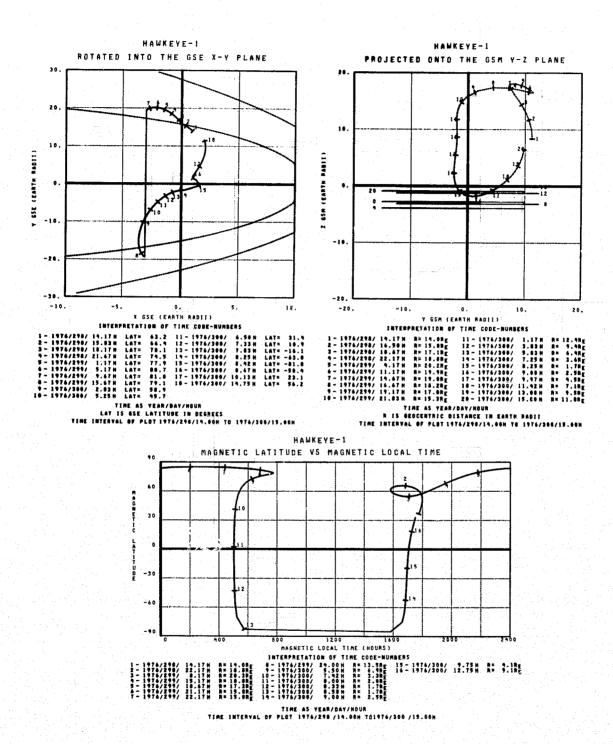


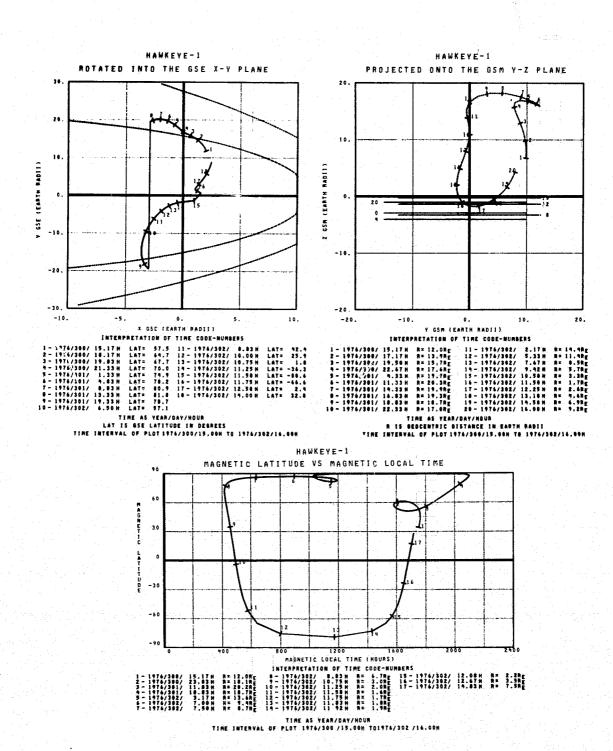




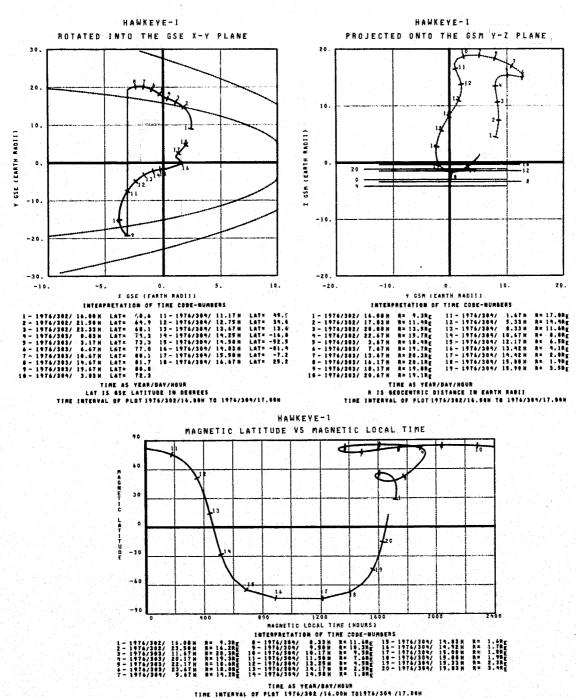




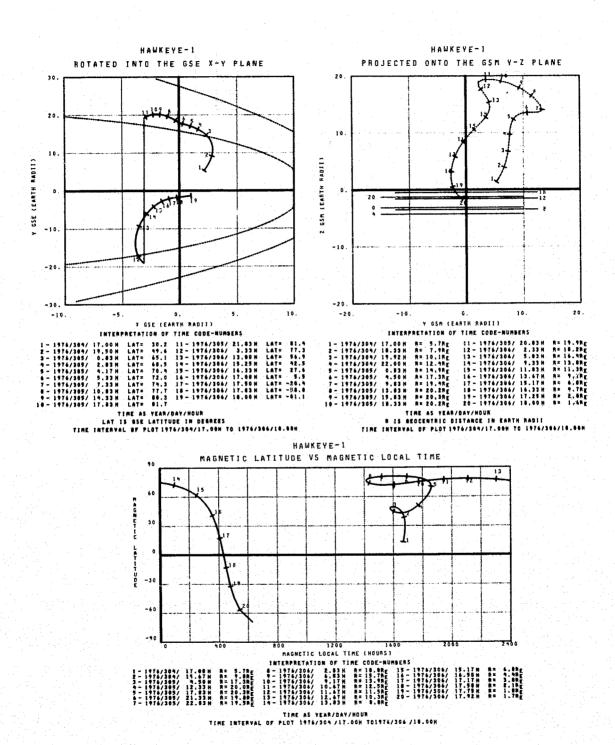


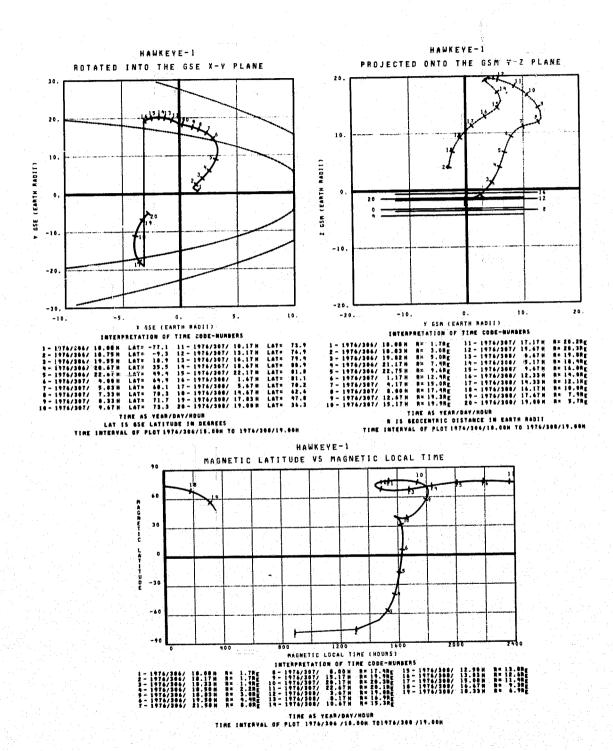


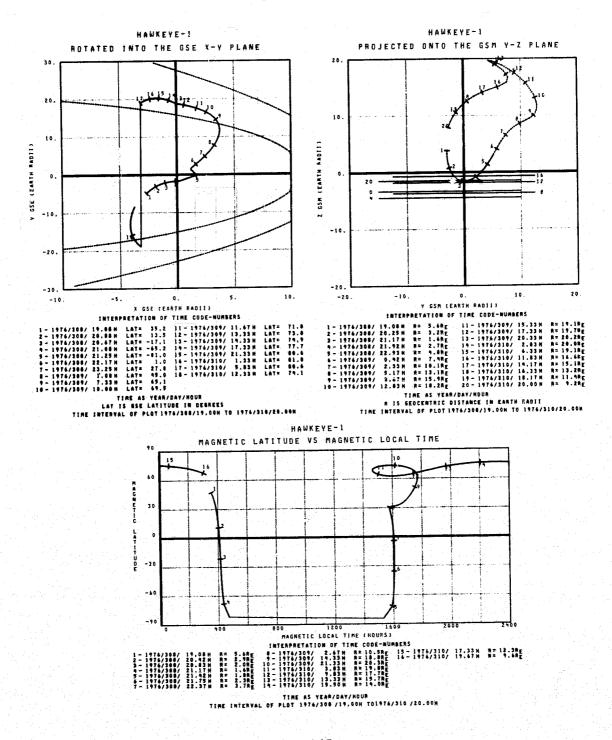


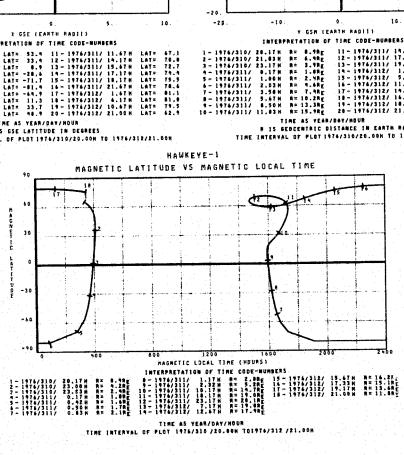


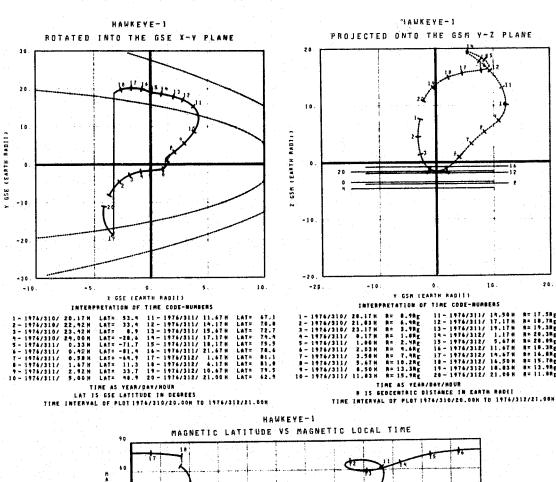
NVAL OF PLOT 1976/302 /16.00H TD1976/304 /17.

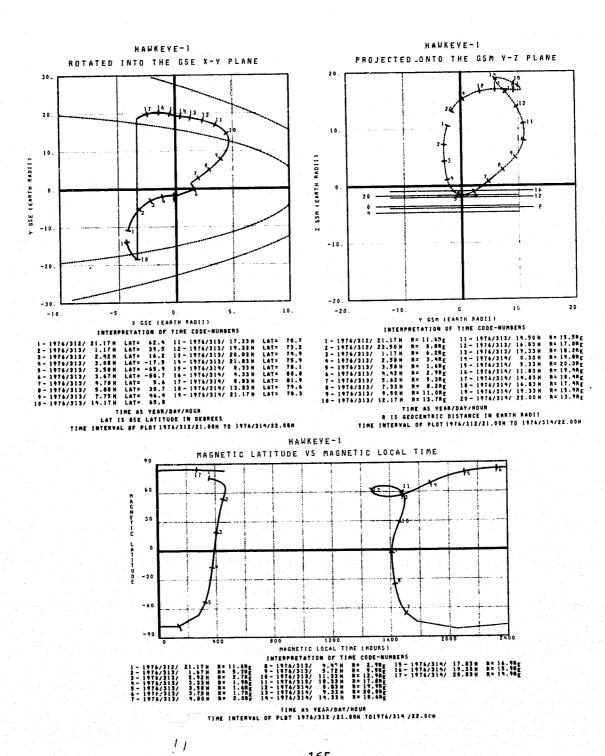




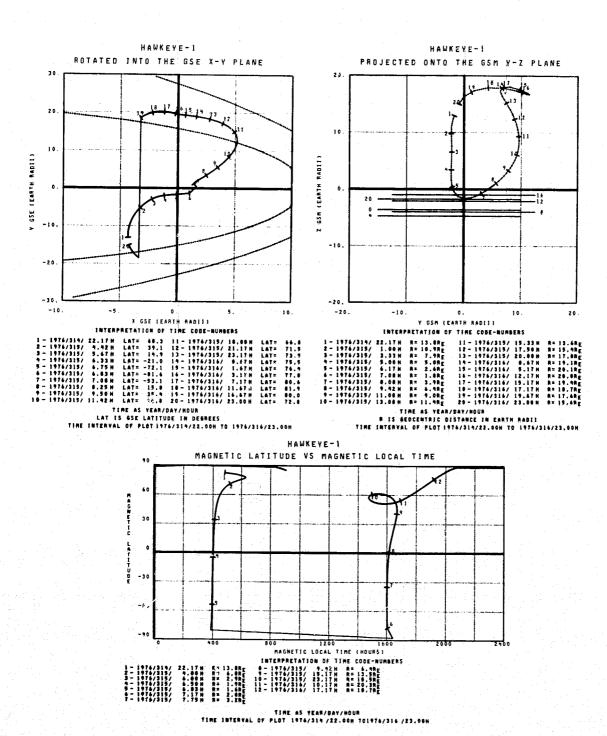


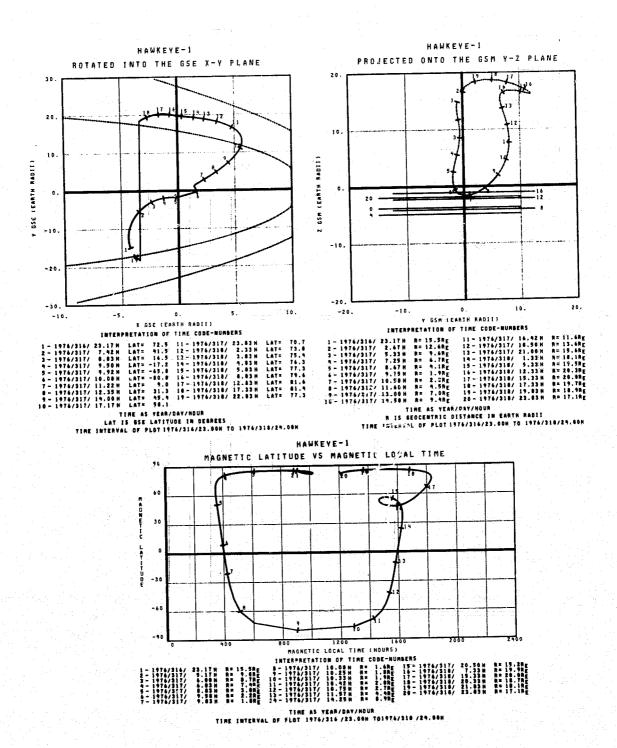


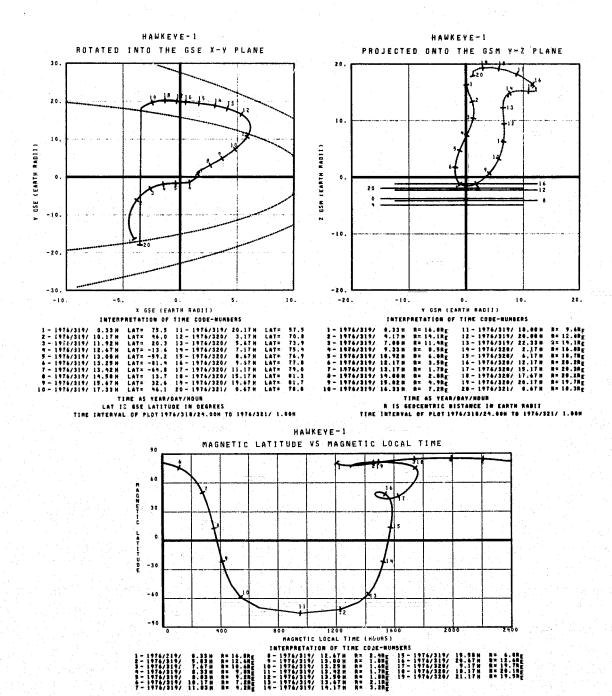




ORIGINAL PAGE IS OF POOR QUALITY

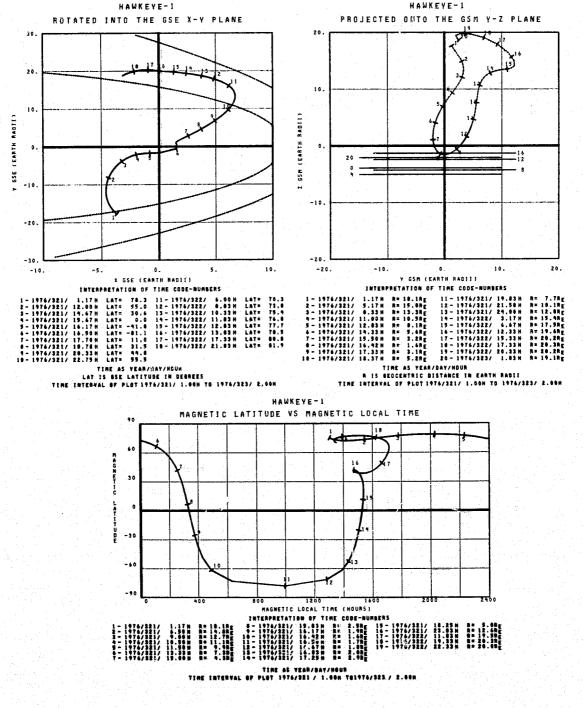


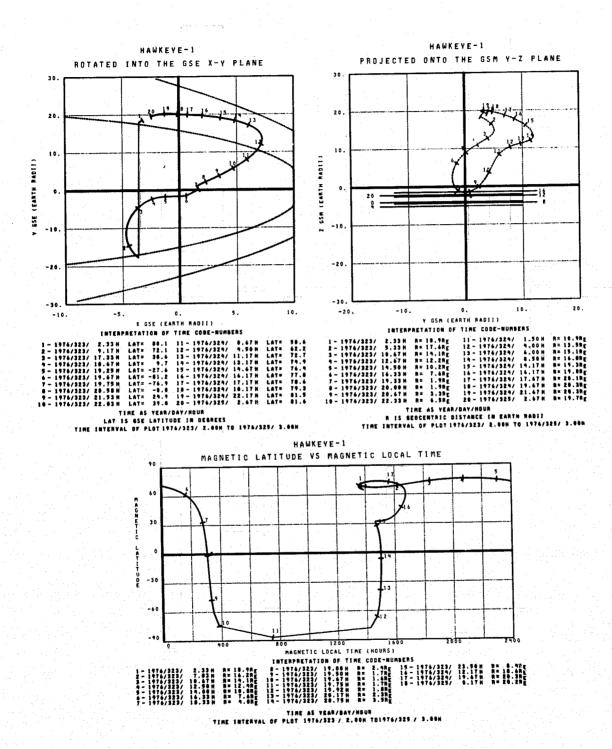


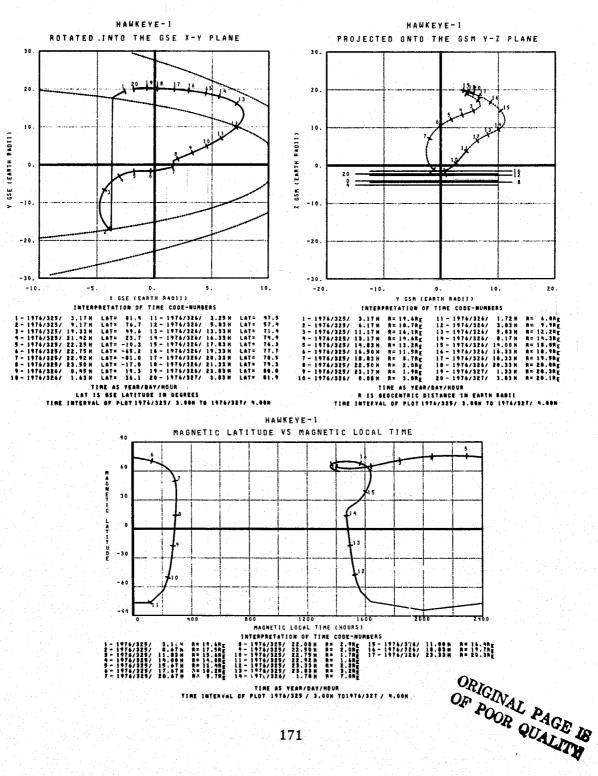


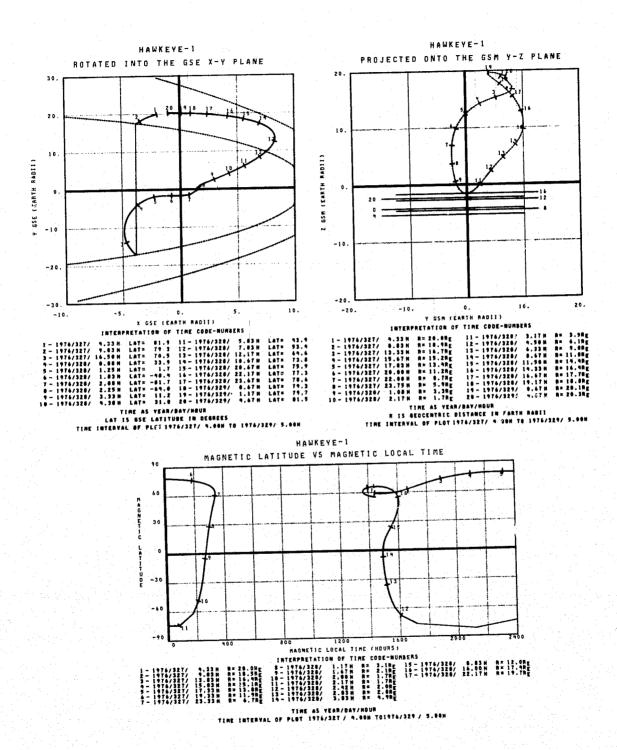
TIME AS VERR/BAY/HOUR
TIME INTERVAL OF PLOT 1976/318 /29.00H T01976/321 / 1.00H

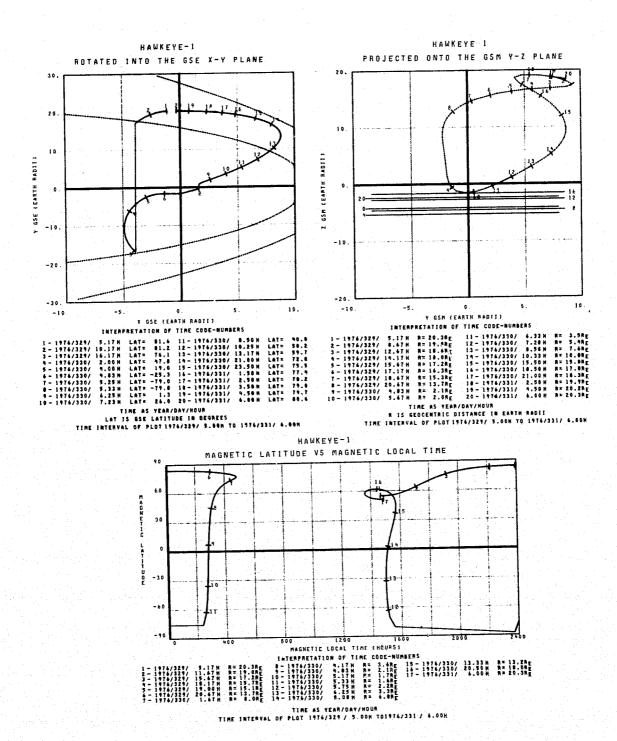


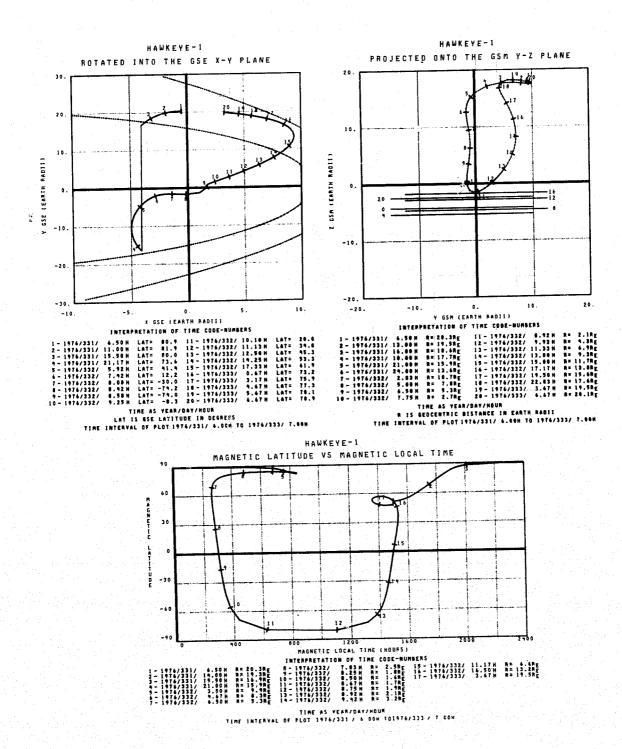


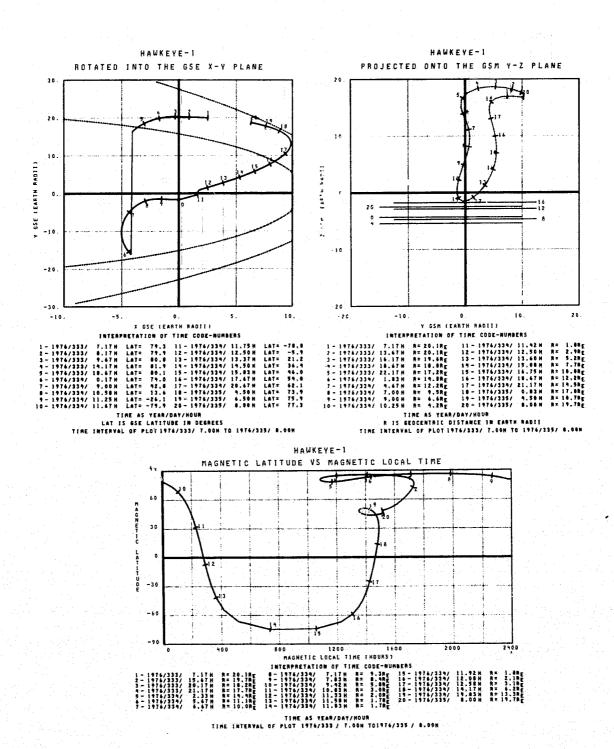


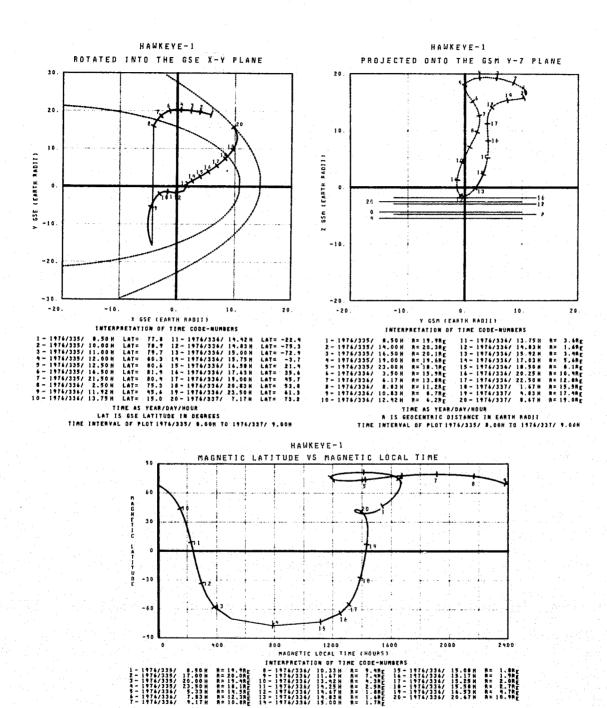


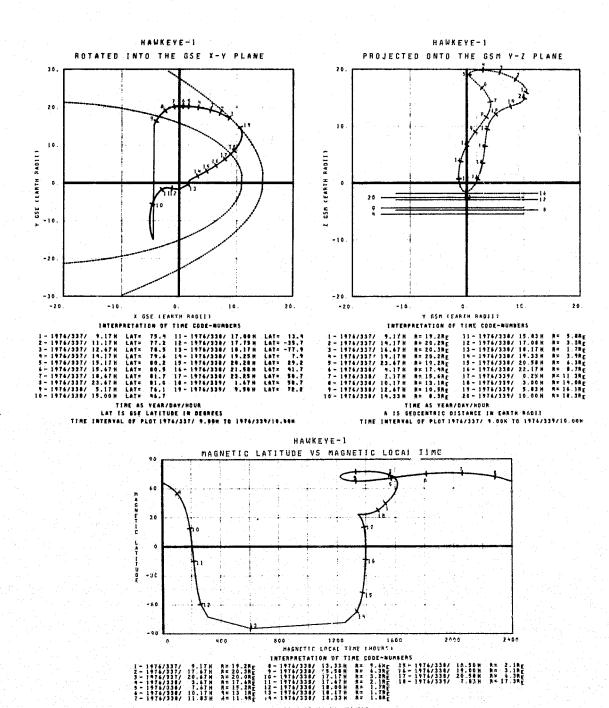






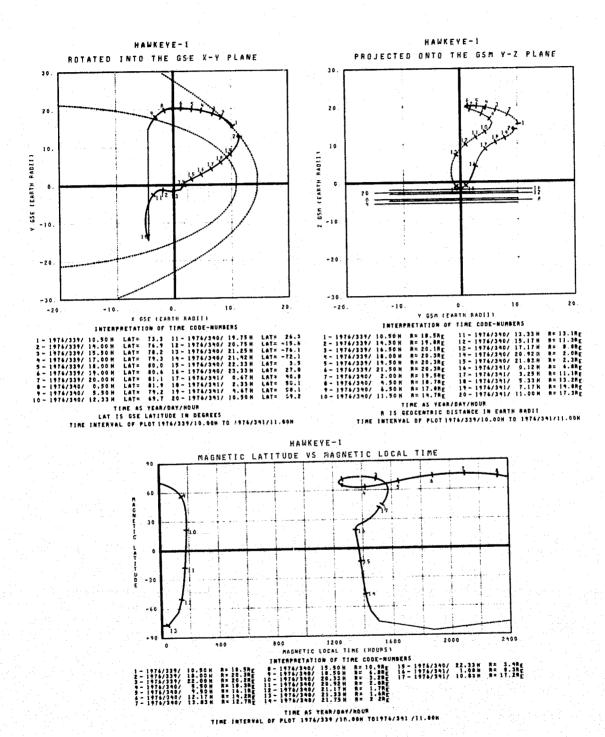


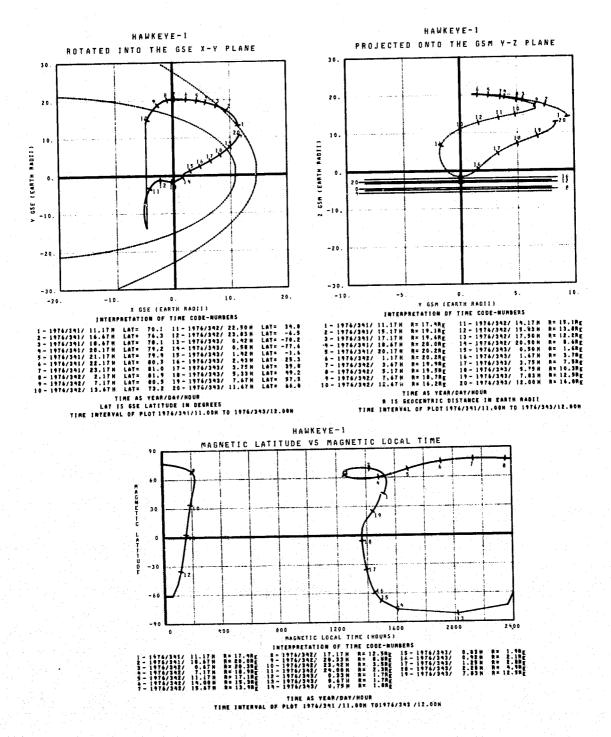


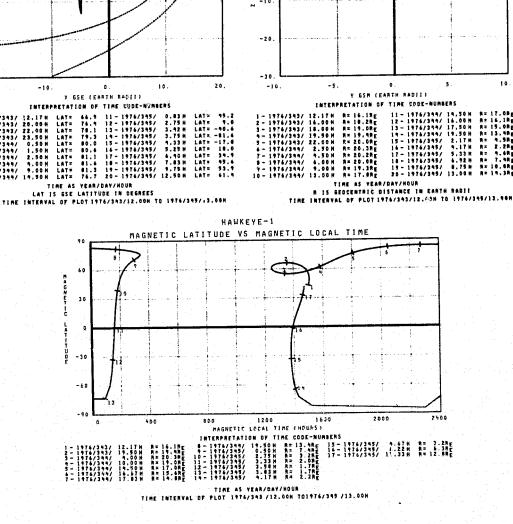


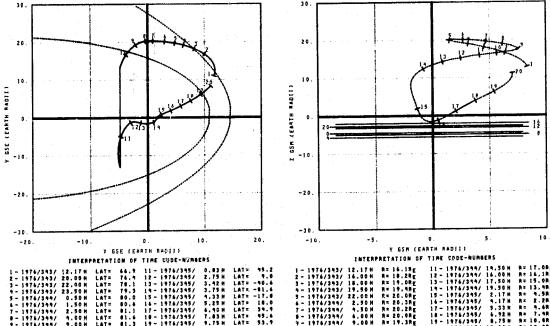
177

TIME INTERVAL OF PLOT 1974/337 / 9.00H T03974/339 /10.00H









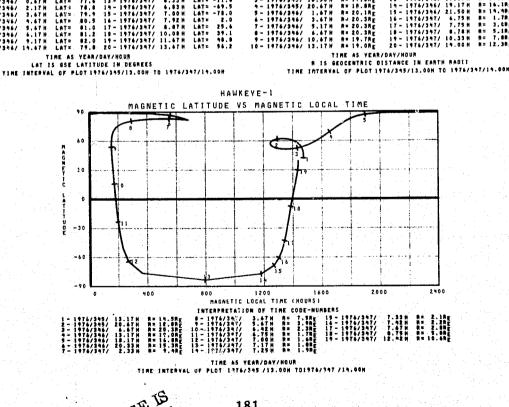
HAMKEAE-1

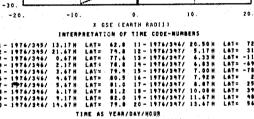
ROTATED INTO THE GSE X-Y PLANE

HAWKEYE-.1

PROJECTED ONTO THE GSM Y-Z PLANE







HAWKEYE-1

ROTATED INTO THE GSE X-Y PLANE

30.

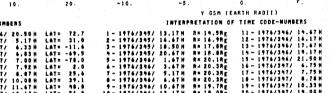
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(EARTH RADIE) 0

6SE -10.

-20.



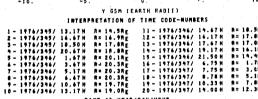
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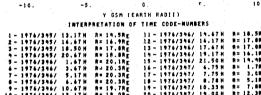
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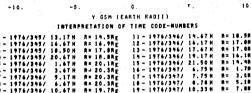
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-10.

Z GSM (EARTH RADII)

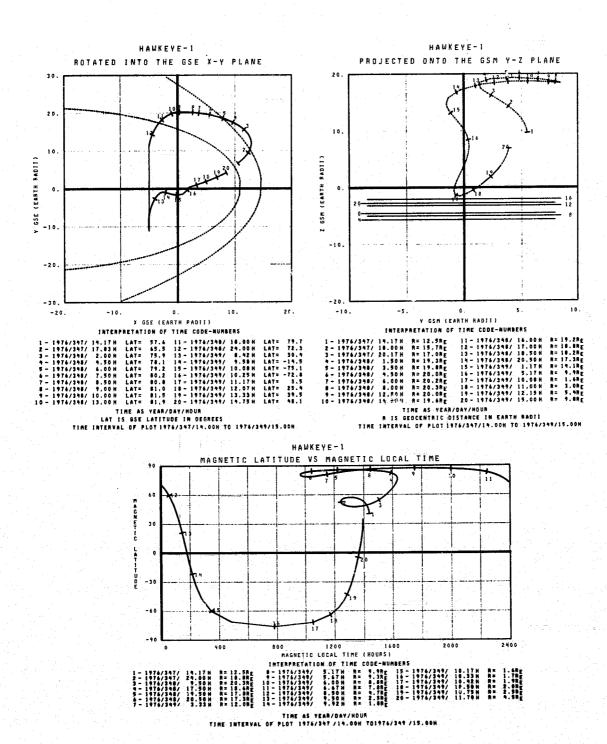


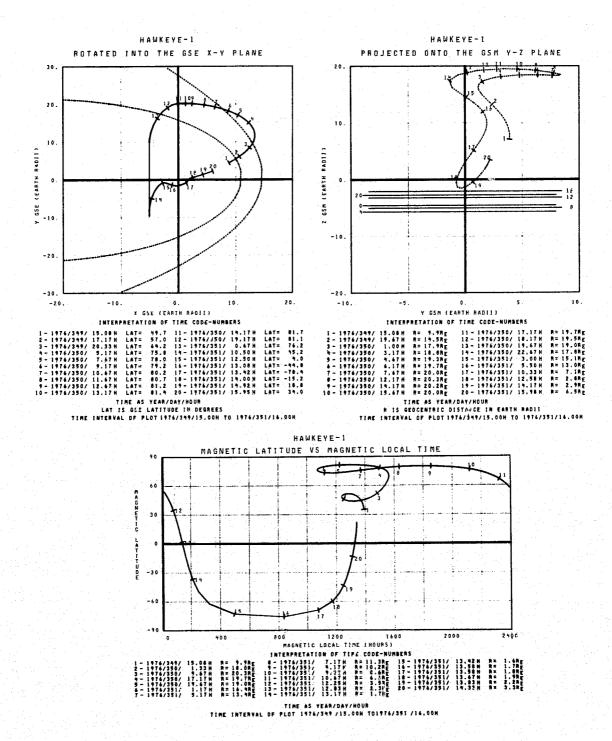


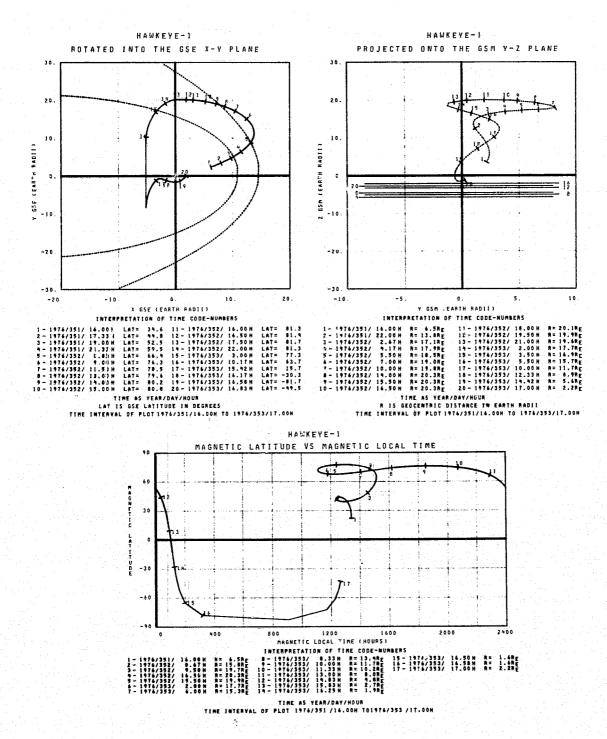


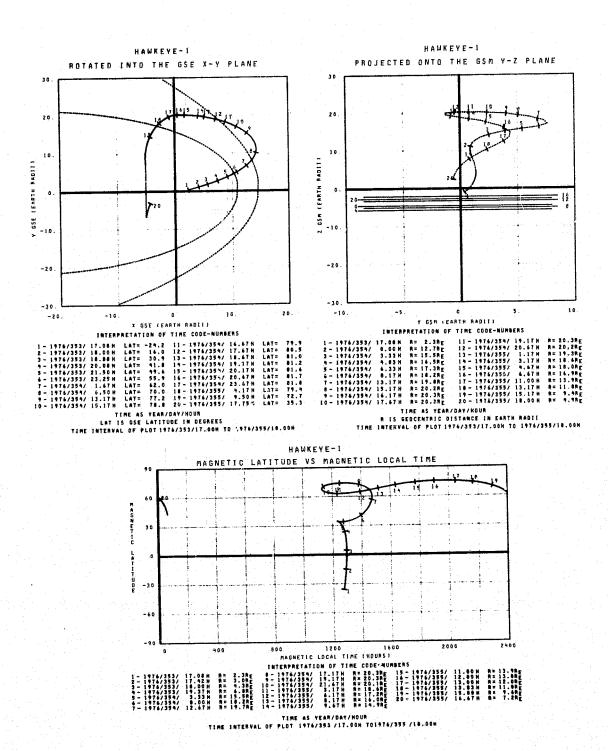
HAWKEYE+1

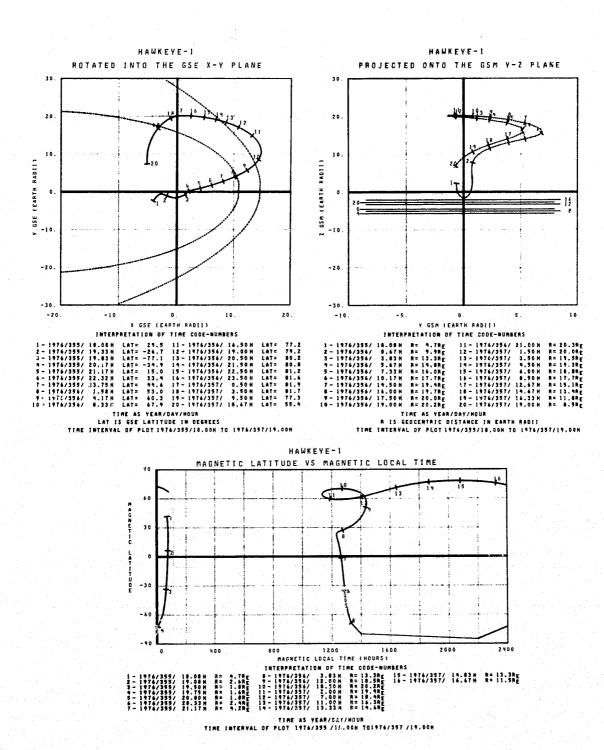
PROJECTED ONTO THE GSM Y-Z PLANE

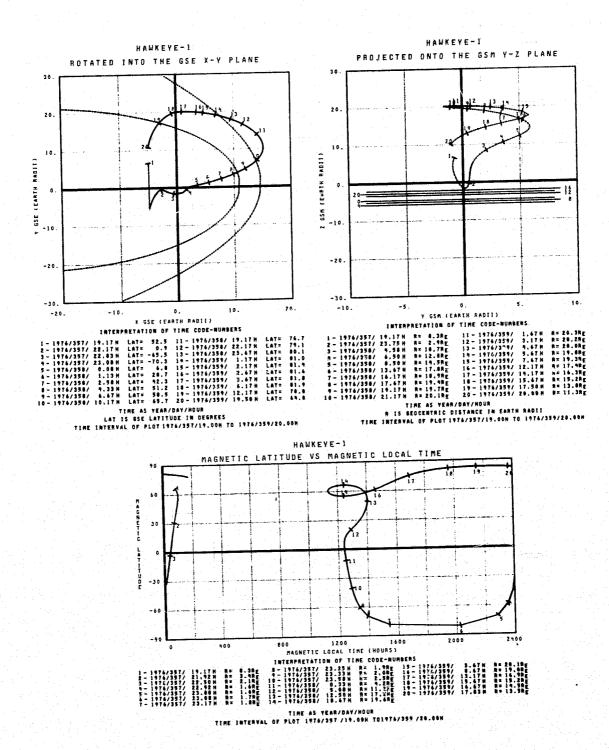


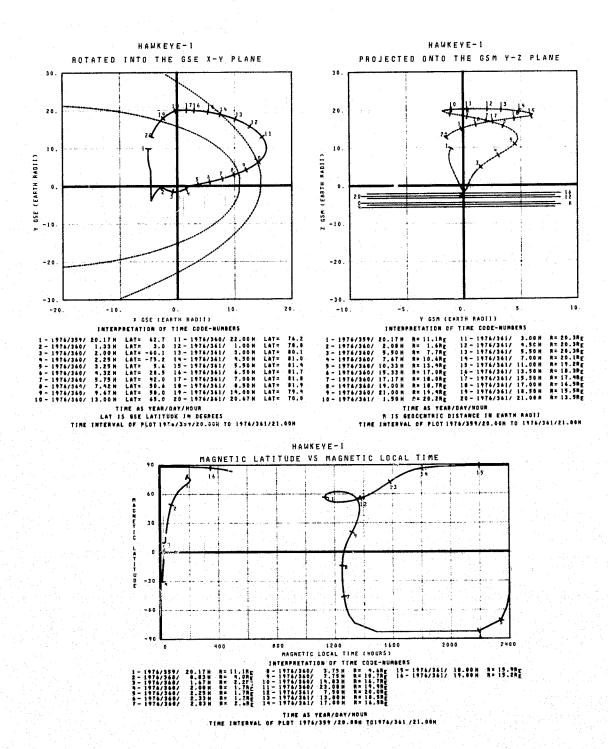


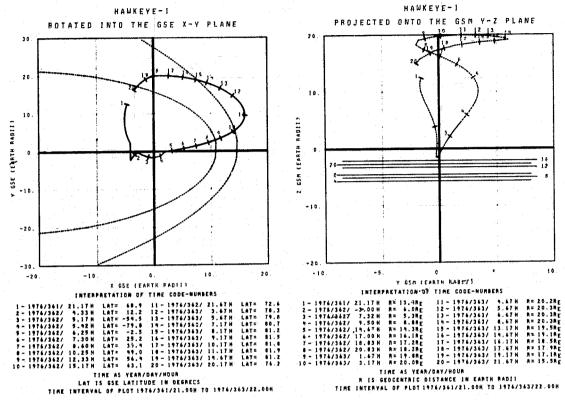


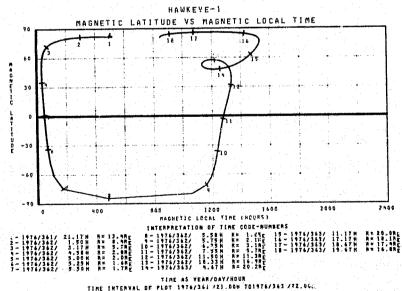


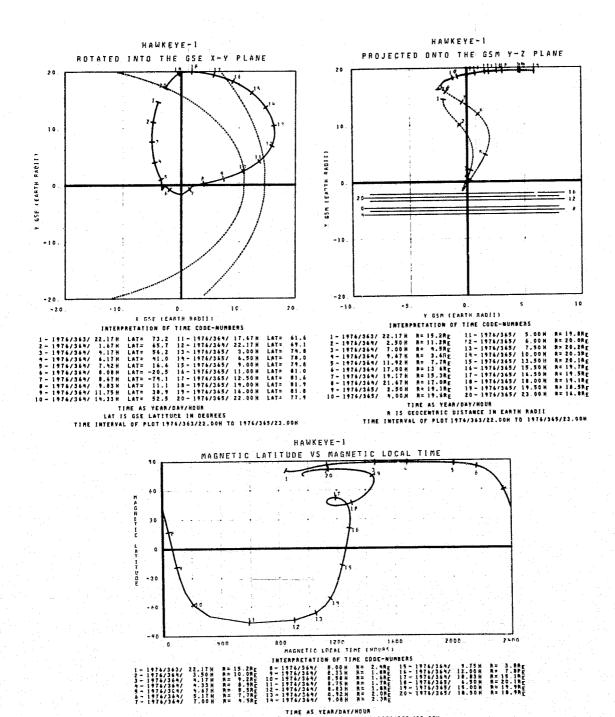












TIME AS YEAR/DAY/HOUR TIME INTERVAL OF PLOT 1976/343 /22:00H T01976/345 /23:00H

